VOLUME XCVII NUMBER TWO

THE NATIONAL GEOGRAPHIC MAGAZINE

FEBRUARY, 1950

PUBLISHED BY THE
NATIONAL GEOGRAPHIC SOCIETY
WASHINGTON, D. C.

$5.00 A YEAR 50¢ THE COPY

Vol. XCVII, No. 2 WASHINGTON February, 1950

THE NATIONAL GEOGRAPHIC MAGAZINE

Formosa—Hot Spot of the East

By Frederick G. Vosburgh

Illustrations by National Geographic Photographer J. Baylor Roberts

"THE POSTAGE will be $86,000," said the Chinese girl clerk at the post office in Taipei, capital of Formosa, as she handed me stamps for sending an air-mail letter.

"I don't want to air-mail this letter to the moon," I started to explain. "Just to England."

Then I realized calculations were in order. These postage stamps cost $6,000 *old* Formosan dollars. Last spring the inflated currency had been stabilized at 40,000 old dollars to one new Formosan dollar, or *yuan*. Many old bills were still in circulation—worth little more than the paper they were printed on.

Let's see . . . 40,000 into $86,000 gives $2.15 in new Formosan currency. At the official rate of exchange the new Formosan dollar was worth 20 cents in United States money. So the stamps really cost 43 cents.

I paid and was motioned toward a public paste pot.

"I see why they don't put stickum on the stamps here," said my colleague, Joe Roberts. "Too hot and humid. They'd all stick together."

Island Eden Bristles with Troops

Five and a half hours out of Tokyo, 1,275 miles away, our big four-engined Douglas plane of China National Aviation Corporation had roared over the north coastline of Ilha Formosa, "Beautiful Island," as early Portuguese explorers called it. Chinese and Japanese call it Taiwan, translated literally "Bay of Terraces."

From the air Formosa had looked as peaceful as paradise. Opalescent waters edged her shores and broke on her beaches in ivory foam. Water-covered rice fields flashed their facets in the sun. Silvery rivers coiled to the sea, and southward to the limit of vision stretched high mountains wrapped in green, their haughty heads cloud-covered.

This illusion of peace had vanished as soon as we landed at Taipei. At a military field alongside lay camouflage-painted American-built planes of the Chinese (Nationalist) Air Force. And almost immediately we had made the acquaintance of Chinese police, bent on keeping Communist spies from this uneasy island.

From the embattled mainland, only 85 miles away, had come a million refugees, including Generalissimo Chiang Kai-shek and many high officials. In addition, the island bristled with thousands of tan-clad Nationalist soldiers (pages 140, 151, 173).

Rivals Australia in Population

An official civilian population figure of 7,026,883, based on a checkup made in April, 1949, was already far out of date in August as more mainlanders kept pouring in.

Troops, their exact number a military secret, raised the total almost to the population level of the continent-country of Australia, more than 200 times Formosa's size. The island reminded me of a heavily loaded lifeboat.

After half a century of Japanese rule, from 1895 to 1945, Formosa had been returned to the Chinese pending a peace treaty with Japan. All the Japanese—some 479,000—had been deported.

The Nationalist Chinese, taking over in accordance with the wartime Cairo agreement

Margaret Bourke from Acme

Chinese Nationalists Moved Thousands of Troops and Their Capital to Formosa

During training maneuvers at Fengshan, Gen. Ho Ying-chin (left), China's former Minister of National Defense, confers with Lt. Gen. Sun Li-jen, in charge of Formosa's defense. American-educated General Sun played a prominent part in the Burma campaign against the Japanese in World War II.

between Allied Chiefs of State, were greeted at first as liberators and brothers by the 6,000,000 Taiwanese, descendants of emigrants from southern China generations before.

This fraternal feeling faded quickly, and dissatisfaction over mainland rule flared into the Formosan revolt of February and March, 1947, in which thousands were killed.

From the Japanese the Government had inherited the problem of Formosa's aborigines, some of whom were hunting heads till shortly before the war. These former head-hunters live chiefly in the mountains of the interior. The Government now estimates their number at 131,261.

At the Taiwan Tourist Company an employee pointed to the interior on a map and said to us with a grimace, "The barbarians live in this part."

When we sought permission to visit the aborigines, the chief of the foreign section of the police looked grave.

"We shall have to send a policeman with you," he said through an interpreter. "For your protection, of course."

Meanwhile, the police required a detailed itinerary, both for the trip into the interior and for our proposed circuit of the island.

Though Nationalist China was fighting for its life against the Communists on the main-

Beyond the Tanshui River, Chikoutai's Rice Fields Gleam Like Panes of Glass

This lonely village in northern Formosa is inhabited by aborigines of the Taiyal tribe. It seems largely paddies when seen from the trail winding down the steep valley side from Chinoparshan to the footbridge faintly visible at lower right. But along the edges of the fields rising in tiers from the river are 80 houses, largely made of bamboo, which shelter some 400 Taiyals (pages 146, 153, 160, and 176).

land, Government offices here were closing at 1 p. m. because of the August heat. While our request went slowly from desk to desk for approval by various officials, we had plenty of time to look around Taipei.*

Taipei Travels Largely by Muscle

Most of the swollen city's 439,793 people seemed to be riding bicycles, rickshas, or bicycle buggies called pedicabs. Jeeps and sleek American cars carried a minority. Wealthy Chinese, chiefly Government officials, had brought Cadillacs, Mercuries, Buicks, Chryslers from Shanghai and other mainland ports. Chic nylon-stockinged Chinese girls with permanent waves and high-necked, tight-fitting, slit-skirt dresses rode bicycles or pedicabs to work in paper-piled Government offices. The city has a few buses but no streetcars.

Except for pedicabs, which often darted about with little regard for the rules, traffic moved on the right-hand side. Chiang Kai-shek in Formosa, unlike General MacArthur

* See, in the NATIONAL GEOGRAPHIC MAGAZINE: "I Lived on Formosa," by Joseph W. Ballantine, January, 1945; and "Formosa the Beautiful," by Alice Ballantine Kirjasoff, March, 1920.

Rice Fields Flash Myriad Mirrors in This Valley of Two Rivers near Taipei

Across the background flows the Tamshui, and closer at hand is the Chilung River, which runs beside the larger stream for miles before joining it—like the Yazoo and the Mississippi. Mist veils the distant capital.

As the Rice Grows, the Puddled Panorama Will Turn Bright, Living Green

In August, when the season's second crop is young, the scene seems more water than land when viewed from the mountains north and east of Taipei. On their terraced flanks grow oranges, tea, peanuts, sweet potatoes, squash.

Theodore P. Thompson and Irvin E. Alleman

Shaped Like a Fish Ready for the Pan, Formosa Has a Backbone of Rugged Mountains

Facing Asia are fertile plains, but on the east coast the mighty spinal range comes down to the sea. There a one-lane highway clings to the cliffs. After four mainland capitals had fallen to Communists in a year, Chinese Nationalists made Taipei their capital in December, 1949. About 240 miles long and a maximum of 85 miles wide, Formosa contains fewer square miles than Connecticut and New Hampshire, but three times their combined population.

in Japan, had decreed a postwar change-over from the Japanese left-hand rule of the road.

As we rolled through the business section in a pedicab, a Taiwanese newsboy stopped us. Briefly and furtively he revealed an English-language newspaper printed in Hong Kong. This he wanted to sell—for four dollars, Taiwan (80 cents, U. S.). We declined the doubtful bargain.

Later we learned this was bootlegged news. Mainland English-language papers had been temporarily banned.

Across a wide plaza from our hotel stood the huge red-brick Japanese-built Government Building, accurately bombed during the war but repaired. New Chinese troops were quartered there, and it bore a new name translated for me as "Long live Chiang Kai-shek Hall" (page 150).

Daily Dozen at Dawn

From this direction, soon after dawn every day, came staccato barks in Chinese. The Generalissimo's troops were taking calisthenics.

The hotel, tucked in a corner of a park full of flowers and waving palms, provided excellent Western-style meals often topped with sweet Formosan pineapple, watermelon, or bananas. When I asked the waiter the name of the blooms that decorated the dinner table, he replied, "We call 'Smells-good-at-night flower.'" To me it smelled good any time.

Beds were equipped with mosquito nettings, and all night hordes of hungry hunters whined just outside in peevish frustration. In the morning when I reached for my clothes a small cloud of them flew out of the closet.

Water was a problem. More often than not, when we turned the tap, none emerged. City water pressure, the management explained, was now insufficient to reach the second floor. The hotel had a pump, but it was often out of order. We became adept at bathing from buckets—in a country whose rushing rivers have vast power potentialities.

Shortly after noon skies usually clouded and produced at least a squall.

"At this time of year," observed an American friend, "you're wet with sweat in the morning and wet with rain in the afternoon."

For keeping off both sun and rain, the arcaded streets of Taipei's business section are ideal. Stores contained quantities of American goods, from gum and soap to clothes and cameras, at considerably higher prices than at home.

Stores and Hawkers Sell U. S. Goods

"That's $8,000,000," Joe was told when he priced an exposure meter. This figured out to $200 Taiwan, or $40 in U. S. money.

United States Army uniforms were being sold. A khaki shirt cost the equivalent of $6, U. S.

On a side street we saw coolie-drawn coal carts equipped with old jeep tires. One cart even wore aircraft tires.

A street-corner salesman selling pineapples, peanuts, and cigarettes said Camels were 58 new yuan a carton. That would make them $5.80, Taiwan, a pack, or about a nickel, U. S., for one cigarette, even at the black-market rate of exchange (6 to 1 instead of 5 to 1). Formosan cigarettes were cheaper. The island grows some tobacco, a Government monopoly.

One of Tainan's Loveliest Flowers Admires Another

Suyz Zoo holds a grand crinum (*Crinum asiaticum*), a member of the amaryllis family. A Taiwanese (Formosan Chinese), she works in the Western-style hotel in the railroad station building in Tainan, one-time capital of the island (pages 151 and 175). Her camouflage-colored kerchief of parachute cloth is a souvenir of United States Marines stationed in Tainan after the war to aid in deporting Japanese from Formosa.

Few Americans live in Formosa—209 at latest count. Occidentals here consist largely of consular officials, executives of the U. S. Information Service and Economic Cooperation Administration, a few businessmen and transient reporters, and devoted, hard-working missionaries, both Catholic and Protestant.

Returning after the Japanese surrendered, missionaries found the war had opened the hearts of hundreds of aborigines to Christian teachings.

"Aborigines had been drafted into the Japanese Army," explained Mrs. James Dickson, of the Canadian Presbyterian Mission at Taipei. "Their officers told them not to let themselves be captured because the Americans would torture, kill, and eat them.

"When my husband came back here after the war, he was met by a chief who said his 600 people all wanted to become Christian. His son had been wounded and captured at Bataan. Instead of the merciless treatment he had been told to expect, he found himself well treated, better fed than ever before in his life, and restored to health by an American Army doctor. I wish that doctor could know the results of his care of that boy."

Another Christian worker, George W. Mac-

Kay, son of a Canadian missionary and a Chinese mother, described aboriginal ways.

"My father used to tell of the custom of getting guidance from the birds when traveling in unfamiliar territory," he recalled.

"If the birds flew back toward home, that was a warning to return; if they flew ahead, it was all right to proceed; but if they flew across the trail, the only thing to do was wait."

Movie Film Lines a Formosan Hat

As soon as our police permit was ready, we headed by jeep for the Taiyal country beyond Kakubanzan, or Chiaopanshan as the Chinese call it, in the mountains on the upper Tanshui River southwest of Taipei (map, page 144). The tattoo-faced Taiyals have long been known as the most warlike of the island's seven major tribal groups.

With us went geologist Arnold C. Mason, of the U. S. Army Engineers, whose mapping work took him in the same direction; an interpreter, Loa Heng Siong, from the Taipei Y.M.C.A.; and our little Chinese policeman "protector," who told us to call him Robert.

Formosa's morning sun was scorching, so Joe stopped to buy a "Panama" hat on Taipei's arcaded main street. The hat—price, 80 cents, U. S.—was a "made in Formosa" product, but obviously its sweatband wasn't.

"Why," exclaimed photographer Roberts, "it's 35-millimeter movie film with the emulsion removed. What, no Technicolor?"

Just outside of Taipei, Formosan farmers were raking rice out into the concrete road. Mason, at the wheel, started to avoid it, then realized the grain was put here to be threshed by the wheels of traffic (page 148).

It was August 10, and in the rice fields farmers were weeding the second crop of the season. Unlike Japanese, who bend from the waist, Formosan farmers get down on their knees in several inches of mud and water and go down the green rows like a charwoman scrubbing a floor (page 172).

Police Station in a Temple

As we passed a Buddhist temple in Taoyuan, west of Taipei, we saw a policeman with fixed bayonet standing guard at the entrance. Robert successfully talked us inside, and we found that the temple was being used as a police station.

"The town is crowded," Robert explained. "There is no other suitable place."

While off-duty policemen ate lunch in one corner, worshippers went through their rites before an elaborate assortment of images.

At a near-by store big bamboo baskets were full of bundles of bills like stage money. This, explained our interpreter, was "money for ghost." Chinese buy this false money and burn it at funerals for use by the departed.

Friends had told us of the strange Formosan push cars, which are pushed by hand or even poled like a boat, and soon after leaving the main road we picked up their spoor—small twin iron tracks 19 inches apart and so uneven that it seemed impossible for a car to stay on them long. These led toward the distant mountains, which were turning from purple to green as we approached.

Far up the track an object appeared, a car about as big as my office desk and half as high. Under a parasol sat the passengers, a mother and her small daughter.

The "engine" was in the rear, a wiry little Taiwanese. When he saw us he grinned and fired what I imagine was his entire English vocabulary. It came out all in one breath: "OK-come-on-let's-go."

Now the road grew rougher and began to climb. Push cars on the wavering track alongside carried coal from a small mine near by. Formosa contains considerable coal, but deposits are chiefly in veins too thin for large-scale production.

Through Blackness to a Different World

When the speedometer read 32 miles from Taipei, the rough road suddenly ended at a dark hole in a mountain spur. Into this muddy, rock-strewn tunnel the push-car tracks adventurously vanished.

As we munched the lunches we had brought and wondered what to do next, an old Chinese woman emerged from the dripping tunnel, her bare feet plastered with mud. To show her appreciation of the prawns we offered from our lunch boxes, she offered to go back through the tunnel and summon a push car.

When the car appeared, its motive power proved to be a 15-year-old Taiwanese girl, short but constructed about as powerfully as a Notre Dame running guard. She pushed five men through the eighth-of-a-mile-long tunnel without even puffing.

We emerged feeling like Alice in Wonderland when she ducked down the rabbit hole. Beyond the barrier mountain was a new, green, and quiet world. Humming of motors had given way to the lulling sound of cicadas and songs of birds.

From a huddle of tiny houses two sinewy Taiwanese men appeared, naked except for shorts. Their legs were knotted with muscles and veins from years of pushing people and freight.

After the dickering the Chinese love, we agreed on our fare to Chinopanshan, only

↑ This Fair Formosan Aborigine Captures Hearts, Not Heads

She comes of a proud fighting tribe, the Taiyals, called "the Mohawks of Formosa," but lives in the now-peaceful town of Chiaopanshan. Prewar Japanese rulers of Formosa called civilized tribesmen "ripe savages" in contrast to "raw" head-hunters.

↓ Home-grown and Secondhand Fibers Blend in Crude Looms

To get the gay colors they love, tribesmen buy bright blankets or cloth, unravel threads, and weave them into strong filaments of native hemp or ramie. The warp, wound around the chestlike object, is held taut by this east coast Taiyal weaver's feet.

"Why Drive the Rice? Rake It Out in the Road and Let the Tires Thresh It!" So Reasons This Farmer Near Taipei

Transportation Bridges from "Newly Motorized" Predecar Railway to American-built Planes of China National Aviation Corporation

Restored "Long Live Chiang Kai-shek Hall," Formosa's Former Japanese Government Building in Taipei, Now Houses Chinese Troops

Lean Young Chinese Nationalist Soldiers March Through the Railroad Station Plaza in Lanzhou, Province's Large Capital

"It's Delicious," Said These Taiwan Tribesmen Squatting Around Their Stew of Giant Snails on the East Coast

[illegible]

Mountain Tribals Hunt to Eat, Smoke to Relax

Blasted from Cliffs, the Coast Highway Forms a Shelf Between Sea and Sky

to find that at a way station we had to pay again "for maintenance of the railroad."

Every quarter-mile or so the push car ran off a bowlegged stretch of track and had to be lifted back on the rusted rails. Log bridges trembled with the ague of age as we crossed gorges cut by mountain streams. Mason, of the Engineers, marveled that these could bear our weight (pages 149 and 157).

"Just the Passengers Get Killed"

On downgrades the pushers ride, keeping the car from running away by crude home-made brakes. I recalled something a missionary had told me.

"Aren't these push cars dangerous?" he once asked a pusher.

"No," replied the coolie. "We always jump clear. Just the passengers get killed."

Of our own pushers we inquired, "Do many people get killed on this railroad?"

"Not so many," was the reply.

"Maybe," said Muse, "he means 'not so many' but what there could be a few more."

Forewarned by all this, we were ready to jump as fast as any Formosan.

As the way grew steeper and the pushing harder we lightened the load by walking ahead. Clouds wreathed the highest peaks. The wild mountain scenery, rank vegetation, and strange bird and insect calls were like something out of Herman Melville's *Typee* or *Omoo*. Wild white lilies gleamed in the verdure and the only sounds were Nature's own.

At my feet a big bird rose in a blur and roar of wings like a ruffed grouse. In the forests cicadas "zit-zitted" a ringing, monotonous, telegraphic tune of dots and dashes.

Once we met push cars loaded with tea, and passenger traffic gave way to freight. Our coolies lifted our car off the track till the others had passed (page 161).

"Miz Lee," of Formosa's First Families

At last, across a deep ravine, we sighted the towering triangle of land on which stands Chiaopanshan, like a lookout on the prow of a ship. After only checking in at the police station, we rolled up to an ex-Japanese inn, now run by a Taiyal, Mrs. Li Goat-kwin.

"Good evenin', Miz Lee, how re you?" said Virginia-born Joe as our slender smiling hostess in slacks appeared with her dark-eyed little daughter. Though they couldn't comprehend a word, they understood the good will in his drawl and grin.

Mrs. Li had a quiet, friendly manner, gentle brown eyes, and white teeth interspersed with gold ones in accordance with the Oriental idea that they improve one's looks.

The tattooed "marriage mark" on her face formed a blue-black line an inch or more wide, running from ear to mouth, then up to the other ear. As one American remarked, "It's cheaper than a wedding ring and more lasting."

A real lady, Mrs. Li wore this adornment with poise and apparent pride (page 150).

It was pleasant to take off our dusty shoes and pad over polished-wood floors to a paper-panneled room where cushions had been spread around a low table. After a hot bath came food, served by Mrs. Li's small daughter—fried eggs, chicken, leeks, breadfruit, and bamboo-sprout soup (served in the middle of the meal); rice, too, of course; tea, and sweet pineapple. (Eating a fried egg with chopsticks gives quite a sense of achievement.)

Mrs. Li, a leader among her people, had represented this district at the Taiwan capital for several months in 1946.

"She say she resign," explained the policeman, interpreting, "because she a lady and not want to do anything political. She say equality of man and woman not very convenient for woman."

For pictures of the true Taiyals our hostess suggested that we visit her home village, called Kelkocal in Japanese, Chikoutai in Chinese, and Lahowana (meaning "leaning tree") in the Taiyal tongue. In Chiaopanshan, we knew, the tribesmen had intermarried with Formosan Chinese and few of the aboriginal ways survived.

Giant Snails Travel Slowly But Far

Hot sun battled through the clouds in the wake of an early-morning rain next day as we started down a steep trail toward a bridge like a spider web that crossed the Tamsui River (page 141).

As we rounded a turn in the wet trail we almost stepped on a huge snail with a shell as big as a lemon. It was a handsome "two-tone job" in cream color and brown. This portable home, roughly conical, rested on a black body about four inches long which was bound for safety in trailside rock crevices at somewhat more than the usual snail's pace, groping ahead with its feelers like a blind man with a cane.

There was no mistaking this slimy stranger. Without any introduction we knew it to be *Achatina fulica*, the giant African land snail, whose legions are devouring vegetation on Saipan, Tinian, and other Pacific islands and have caused consternation by invading Hawaii. Recently it smuggled itself into the United States on salvaged war equipment landed in California and at New York and Baltimore but the Department of Agriculture reports

Broad Bands of Tobacco from Ears to Mouth Show a Woman Is Married

[illegible] Most adults of both sexes [illegible] Behind her is a year-old father [illegible] only [illegible]

that all the invaders were detected and destroyed by plant quarantine inspectors.

[illegible] is the only word for the creature. [illegible] mature Achatina is both a he and a she, and this sexual versatility makes each [illegible] a potential egg-layer.

[illegible] giant snails spread to Formosa from China, and this subtropical [illegible] proved an Acatina Eden. We [illegible] later in distant areas, for they have [illegible] over landscapes [illegible] square miles. Even in the capital city they strip leaves and flowers from gardens.

[illegible] the die shells and [illegible] 152 [illegible]

Japanese [illegible] their mounting population. Some were [illegible] as guest houses in Taiwan but proved to have little palate appeal. Fortunately for Japan, the climate there proved too cold for the snails to thrive in the open.

Suddenly from ahead came a shout. Mason had almost stepped on a snake, a black fellow ringed with white and about five feet long.

"If you are bitten by that snake," a Taiwanese told us later, "you soon die."

All hands left the [illegible] stranger strictly alone. It was [illegible] arrest with a nerve [illegible] more [illegible] than that of a [illegible]

Shaky Bridge Leads to Taiyal Town

Another downward [illegible] and we reached the Japanese built [illegible] that spans the Taisiet River [illegible] a wooden catwalk about 18 inches wide and 100 yards long, with many holes and loose boards, [illegible] from cables of [illegible] A network of wires on each side serves as a safety net to keep pedestrians from falling

"Many People Get Killed on This Railroad?" "Not So Many," Said the Pushers

[illegible]

[illegible] below.

[illegible]

[illegible] Englishwoman [illegible]

[illegible]

U. S. Fertilizer on Formosan Fields

[illegible]

Hills Facing the Pacific Protect This Man-made T-shaped Harbor from the Full Force of Typhoons

[illegible]

Giant African Snails Abound in Formosa; Chinese Feed Them to Poultry, but Some Fatal Meningitis For Them in Stews (Page 152)

Chinese Peasants and Tribesmen Pass at a Different World

[illegible] the photographer's rope of the Nationalists [illegible] England [illegible] Newfoundland, on the opposite side of the world [illegible] the level of his little bamboo pipe

[illegible] On their return trip from China [illegible] they had brought the precious natural rubber to their beleaguered [illegible]

This was the mountain "grass roots" end of the long arm of E.C.A. To prevent widespread want, disorder, and possibly starvation the U. S. Government's Economic Cooperation Administration was providing these essentials for good [illegible]

The chemicals had to come at high cost from the distant USA and Canada because Japanese nitrate [illegible] source of explosives as well as fertilizer—were casualties of World War II and Japan's postwar disarmament.

Miss "Not Beautiful Dressing"

At the first [illegible] of Chinese [illegible] highly greeted [illegible] the international language of American [illegible]

The village had been shorn of most of its picturesque. Its girls with their colorful [illegible] costumes had gone to the city of [illegible] for several days to entertain Chinese Nationalist troops.

Of those that remained [illegible] some of them have no [illegible] dressing.

Two of the houses seemed on fire but investigation showed that the smoke was [illegible] Its way out through the airy eaves of the bamboo roof. Houses were largely bamboo.

When I emerged [illegible] or ten Taiwanese were clustered about the NATIONAL GEOGRAPHIC MAGAZINE which Joe always carried as an unofficial passport.

"I was reading about Newfoundland while you looked around," said Mason, "and they took it away from me."

Downhill Goes a Test Freight; the Engineer Miss His Brake

[illegible]

Education [illegible] One has [illegible] intelligent [illegible] good English and explained [illegible] from school in [illegible]

[illegible] had [illegible] war in [illegible] and kept announcing, "America [illegible] gone."

Younger Generation Formosa

Four generations of [illegible] how the life of the [illegible] original 80-year-old father [illegible] 51-year-old [illegible] mother, both with [illegible] Japanese [illegible] after [illegible] brothers [illegible] both traditional and [illegible] old-fashioned [illegible] dressed with all the care of any American lady.

[illegible] pulling their bamboo pipes [illegible] a visitor's chair. [illegible] around the circle like a pipe [illegible]

[illegible] people who [illegible] to a smile and a friendly gesture (pages 155, 170).

We left to the accompaniment of Japanese [illegible] sounded like [illegible] "cigarette" [illegible]

After a [illegible] we dumped on the floor of Mrs. Lin's [illegible] what we had had for dinner the previous [illegible] breakfast that morning, then started down the mountain on the push car.

In the seven miles the car jumped the track 15 or 20 times, but nobody suffered more than a jolt, since the careful coolies, braking constantly, kept the speed down to about eight miles an hour.

Emerging at last from the dark tunnel that formed the entrance to this different world, we drove back to teeming Taipei, slept, and boarded the jeep next morning for a trip around the island. Few persons make this arduous circuit, for neither roads nor rails entirely encircle Formosa (map, page 144).

Roller-coaster Road to East Coast

From Taipei we headed for Chiaochi on the east coast, over a bumpy, rocky, roller-coasterlike road through rankly wooded mountains studded with giant tree ferns.

Artificial caves along the way had been blasted out by the Japanese for storing war supplies against the invasion that never came. Instead, the Allies struck at Okinawa, 370 miles northeast.

Landslides had dumped tons of rock and dirt on the road, and crews of young peak-hatted Taiwanese—mostly girls—were serious ing the debris in shoulder-suspended bamboo baskets. When they threw it over the cliff below, seconds passed before the sound reached us.

After noon came the daily rain, this time a cloudburst that all but hid the road and yawning gulf. Discretion demanded a stop.

Drenched, we turned in at the first shelter, a tiny house-store selling "ghost money," cookies, tea, and straw hats. The Taiwanese girl in charge served us hot tea and would take no money. Candy bars and soap expressed our appreciation.

On we went, while the day wound and rain clouds walked the sky.

Just at sunset the jeep rounded a turn, and we stared enthralled at the picture painted against the sky. We had reached the edge of the mighty escarpment. Far below lay a green plain and beyond it the Pacific.

Offshore, like a sea monster, sprawled Kueishan (Tortoise Mountain) Island and a rocky islet forming the turtle's head. Arched in glory around the scene, a rainbow formed a softly painted frame.

American Tragedy: "No Blead"

Still under the spell of this sight, we wound down the steep mountainside to Chiaochi, where we found a former Japanese inn. After a few words in Chinese, Chao-shing Wang, Mason's interpreter, turned to us with tragic face.

"They have no blead," he said.

Like almost every Taiwanese we met, Wang seemed to think Americans would die if they did not eat bread daily.

Thanks to a huge dinner featuring chicken soup, pork, eggs, bamboo sprouts, big bowls of rice, tea, and bananas we managed to live breadless till morning.

Jeeping south next day toward Suao, we passed paper factories fed by wood from the mountains. Freight cars bore huge cryptomeria logs to be sawed into lumber.

Camphor trees thrive in the mountains. Formosans hack the trees into chips, distill them, and send the product to Taipei for [illegible] maker for Formosa, source of most of the world's supply, but large-scale manufacture of synthetic camphor from turpentine by Du Pont and others has reduced production of the natural kind to a minor industry.

Glassy fields of rice between mountains and sea were dotted with Formosa's white herons. These are cattle egrets that feed on insects flushed by plodding water buffaloes.

At a pool by the road sat a Taiwanese boy. A small rope in his hand led down into the water. I thought he was fishing. Suddenly he jerked the rope and up came a huge slate-colored head with curving horns—a water buffalo.

Each of these giant creatures, used for tilling the fields, is tended by a pint-size boy or girl (page 174).

One-lane Highway Carved from Cliffs

Gradually the plain petered out, and at Suao the mountains came down to the sea. Here began the most spectacular and dangerous road I have seen, the Japanese-built east coast highway carved from the face of thousand-foot cliffs. At some points it is blasted through cliff walls; we counted 14 tunnels (pages 154, 158, 163).

This road is only a single track, with occasional turnout places—but traffic is two-way. Several times we rounded a curve and just as I saw a truck or bus coming head on in the same narrow track.

In places the outer edge of the road had caved away, carrying concrete guardrails with it, down to the turquoise-bordered sea hundreds of feet below. In their stead some joker had placed feeble little foot-high stones.

At one point hundreds of golden-backed spiders seemed to have joined forces to ambush every flying insect in the vicinity. Their round webs, the size of an average window, hung from telephone wires and bushes for a mile, forming a formidable barrier for butterflies and other potential prey. In each sprawled a spider

Only That Narrow Gash of a Road Lines North and South Along This Rugged Coast

Where Tomorrow's Water System Lures, Soldiers Cast This Well Beside Old Fort Providencia. The Men Are Glad for Physical Training

Sculptors of Neoclassical China Get Inspiration at the Feet of a 17th-century Hero

As Gods Arrayed as Jungle Birds Amis Gather for a Dance

[illegible]

Castle Fishing Crafts Ply Sun Moon Lake, Chief Source of Electric Power

Lava Movements Dance with Slow, Precise Movements Stirring the Whole

With Wooden "Bells," Natives at Sun Moon Lake Play an Aborigenal Carillon

four or five inches across, ominously waiting for dinner to fly in.

On the cliffs of soft schist and harder limestone crawled more of the giant African snails we had met near Chikopotshan (page 155). Taiyal tribesmen, less clean than the ones seen there, were gathering and stewing them over campfires (page 152). Only the "best" part is eaten, the rest being fed to pigs.

"How do they taste?" we asked through an interpreter.

"Delicious!" was the reply, but none of us grasped the opportunity to try them.

When we stopped at a Taiyal village we were almost mobbed, the aborigines were so enthusiastically friendly. In the cluster of huts stood a little wooden church with a big cross, and perhaps the tribesmen associated Americans with their much-loved missionary (pages 147 and 169).

When we drove away the whole village came running after, waving and shouting good-byes. One lad pursued the jeep for a quarter of a mile.

Soon we crossed the silt-laden Taroko River and on foot explored Taroko Gorge, a silent place of towering cliffs and occasional wild-looking Taiyals hunting snails, panning for gold, or scratching in lonely sweet-potato fields.

Where the river dashes from this defile a hydroelectric power plant stood silent and idle, paralyzed by mounting banks of gray silt which blocked its outlet. One at Tungmen fared even worse: it was buried bodily in sand when the river bed rose 50½ feet!

One reason for the growing gravity of the problem was as apparent as if it had been emblazoned on the mountainsides—increasing cultivation of steep slopes, usually for planting sweet potatoes. Formosans burn patches of mountain forest, grow a few crops till fertility is gone, then burn another slope. Heavy rains quickly leach out nourment and carry more of the soil itself down to these latest streams.

Site of Wartime Prison Camp

At a troop encampment outside Hualien-hsien, known to the Japanese as Karenko, athletic-looking Chinese soldiers were playing football. "We Must Keep Our Homes Happy," said a large sign in Chinese. "Stand Firm," exhorted another.

Here during wartime the Japanese maintained one of the prison camps which made Formosa synonymous with suffering to many an American soldier, including Gen. Jonathan M. Wainwright, U. S. commander at Corregidor.

Not even a jeep could go much farther south than Hualienchiang harbor and site of a wartime Japanese aluminum plant. Here rails take over, forming a tenuous link with Taitung, 108 miles south.

From a missionary we learned that rivers swollen by typhoon rains had washed out the railroad at several points and passengers had to walk across them, carrying their luggage. Joe, burdened with photographic equipment, decided to stay with the others and photograph the gay, dancing Amis (pages 166-7).

At dawn next day I set out alone, the one white man in a jam-packed train of Formosan Chinese and a few aborigines.

"If you are of good will your will have no trouble," Wang the interpreter had said. I found it true. A smile and a greeting in my own language invariably brought an answering smile—and help if I needed it. I wondered if a lone Formosan aboard a crowded American train and dependent entirely on sign language would have fared as well.

Fellow passengers squeezed close together to make room for me to sit. On one side sat an aged grandma clutching a huge edible bamboo sprout and a grandson not much bigger. A farm woman across the way had clucking chickens in a bamboo basket. One man carried a live duck. Others had rice or other produce in gunny sacks or wrapped in matting.

Five Walks in 108-mile Train Trip

Our route lay across the Tropic of Cancer, and as the burning sun rose higher it turned the train into a series of ovens. All the passengers visibly wilted; all except one, a Buddha-faced woman calmly nursing her baby. Her expression never changed.

After several stops at noisy towns, the slow-moving train jerked to a standstill, a trainman jabbered something, and everybody began to get off, restrapping babies on backs, picking up bamboo sprout and grandson sprout, chickens, duck, rice, and assorted bundles. I followed suit, shouldering my heavy bag.

Outside was a strange, almost Biblical, jolt—a long procession of humanity winding across a wide gray waste of rock and silt, flood bed of a restless river. Bridge and approaches had been cut in several places. Rails with ties clinging to them formed a precarious footway across the now-shrunken sullen gray stream.

As I looked, something shielded me from the sun; a stranger was holding a parasol over me and my sunburned nose. In a halting handful of English words, this pleasant-faced little fellow passenger introduced himself as Mr. Tsai and a stocky friend as Mr. Tsung. Could they not, he asked, carry my bag?

At first I declined this friendly offer, but by

Weeding Rice, Performers Crawl Through Mud and Water on Hands and Knees

To lighten the drudgery, neighbors help each other. In this field the author counted 12 men chatting and laughing as they slopped along on bare knees, their hands always busy under water among the green sheets of young rice. The method contrasts with that in Japan, where weeders walk and stoop over

[illegible] ing the bag and I was carrying the parasol.

[illegible]

Every time a typhoon comes, the rains turn the [illegible] destruction that bowl down the low timber-and-masonry bridges like tenpins. Now nearly [illegible] like pin boys "setting 'em up in the other alley."

[illegible]

"No money," he replied. "People here on the east coast are poor and revenues are low."

That was true. My ticket cost the equivalent [illegible] ride (and walk).

[illegible] and wearing no bathing costume, was strong [illegible] long-haired as frogs. He was the image of all [illegible] the train, "dressed" in half a second, and [illegible]

Aini Women Smoke Big Cheroots

[illegible] women in Western-style dress [illegible] [illegible] and [illegible] [illegible]

Farther south, a brown-faced Batan boy in an old Japanese [illegible] cap insisted on carrying my bag; he would accept no reward.

Chinese Nationalist Soldiers Hit the Dirt in Training on Formosa

[illegible] crawl full length and crawl under barbs [illegible] them [illegible] the special sand [illegible] up [illegible] times and [illegible] machine tremors on the mainland

After these hut, [illegible] children came down in tears. [illegible] one small Taiwanese girl, I gave her a pellet of candy-coated chewing gum. Her father thought it was medicine and tried to get her to swallow it. She only cried the more. When I demonstrated the use of gum, she chewed it and lower gave way to sun

Wooden seats got harder and harder. One well-dressed Taiwanese man squatted on his heels on the seat instead of sitting down.

High mountains, often scarred with farms looked down on the plain through which we passed. The Japanese developed this area for planted farming, but mountain rivers writhe out of hummocks, spewing silt over rice and sugar cane

Toward the end of the all-day rail and foot trip a little Chinese fellow passenger spoke to me in good English, and I realized suddenly how keen had been the hunger for conversation. Mr. Chou, a refugee from Canton, was bound for the west coast, as I was; we decided to travel together

Next Stage by U. S.-made Bus

At Taitung, minor port and end of the railroad, my new friend found us an inn and managed to buy us hard-to-get tickets for the next stage of the trip, by bus. The one we boarded next morning was a Ford, jammed with luggage and passengers, including a squad of Chinese soldiers in peaked uniform caps, shorts, shirts, and basketball shoes.

Until I made an overture, these rifle-toting troopers seemed rather suddenly silent. Then they softened up and one offered me a bunch [illegible] bananas, small pulpy fruits with a nut-brown [illegible].

Only once did we have to stop, [illegible] flood-weakened bridge. Empty except for the driver, the Ford crossed gingerly [illegible]

In a Mountain Stream, Water Buffaloes Take a Sunday Afternoon Siesta

[illegible]

Music was Mr. Chou's hobby, and when it rained he sang an Ami rain song.

"It means," he explained, "that the rain is like a young girl's tear. The Ami mind is simple, but the heart is good."

Skirting high cliffs and threading wild mountains, we finally crossed the southern end of the island and reached the fertile western plain at Linpien on the west coast railway. Waiting for a train were tall young members of the Chinese Fourth Air Force, their unit shoulder patches attached with safety pins.

Here and there, airfields abound. These and the big naval port of Kaohsiung (Takao) were used by the Japanese as springboards for their attack on the Philippines. Under the Chinese Nationalists, Kaohsiung is still a closely guarded military area. With a population of 211,000, it is second only to Taipei in size.

When we reached Pingtung and found a former Japanese inn, Mr. Chou disappeared into the night, though rain was pelting down. In an hour he returned with a loaf of "bread" for me. He had scoured the city for it in the rain.

Signs of Wars 300 Years Apart

Past fields of sugar cane and pineapple, banana plantations, and paddies, we chugged next day to historic Tainan, once the capital of the island and now its third largest city. A good Western-style hotel occupies part of the railroad station (pages 145, 151).

As I passed an open door, I saw a white man pounding a typewriter and realized with a start that this was the first white face I had seen in two and a half days. The welcome acquaintance was Herbert G. Bennett, an Englishman selling American lubricating oil to sugar-cane crushing mills.

In Tainan, as in other principal cities, the seat of local government had been neatly dispointed by wartime bombing.

"You chaps just pranged 'em in the vital spots," said Herb, who had served as an officer in the Royal Air Force.

"The aluminum factory in Takao was 60 percent destroyed, but not the big cement mill there. Cement was needed for postwar reconstruction.

"At the Sun Moon Lake power plants bombers got the transformer stations without destroying the turbines. Beautiful bombing!"

U. S. Air Force and Navy pilots share the credit for such hamstringing, and British carrier planes attacked Formosan airfields.

At Tainan, too, are more survivors of a far older war—brick forts built by the Dutch more than 300 years ago. After nearly forty years they were driven out, and the island was restored to the Ming Dynasty by the warrior Cheng Chen Kung, or Koxinga as the Japanese call him. This fighting son of a Chinese father and Japanese mother is still a hero to Chinese, Japanese, and Formosans (page 165).

In Anping, Tainan's old port, I found the remnant of Fort Zeelandia being used as a police station. From a concrete watchtower erected upon the brick ramparts by the Japanese, I looked out to sea and down on the town, which seems to contain less land than water—large ponds for making big fish out of little ones. Down a canal glided a fishing boat with rusish, reddish, triangular sail.

Fort Provlentia, in the heart of Tainan, looks about as Dutch as a pagoda. Koxinga rebuilt it in Chinese style, and now its ornate dragon-crowned but leaky roof shelters a museum (page 148).

"To become an army officer in the Ching Dynasty, a man had to be able to lift this stone," said my young Chinese guide, tugging vainly at a rock about the size and shape of a small safe.

"Formerly I think Chinese people more strong, same as Western people."

I had left Mr. Chou in the bosom of his family, newly arrived by air from Canton, but just before I boarded a train for the north he hurried into the station. Friendly and thoughtful to the last, he bore a present of Formosa tea.

Saucedar and Sugar Bowl

The west coast train was prompt and comfortable and never required its passengers to walk. Here the coastal plain is wide and green, unravaged by rampaging rivers.

Fields full of sugar canes waving swords alternated with green-rowed mirrors of rice, fruit plantations, and vegetable gardens beside farmhouses of brick and tile.

Saucedar as well as a rice, sugar, and fruit bowl, the southwest coast makes salt from the sea and annually ships thousands of tons to Japan for industrial use, chiefly from Putai and Kaohsiung.

Distributing centers for farm produce are such cities as Chiai and Taichung, roughly the size of Bridgeport, Connecticut, and Fort Worth, Texas.

Many of the sugar-cane crushing mills that abound in this part of the island were "pranged" during the war, but repairs have been pushed.

Major industries are controlled by the Taiwan Provincial Government, and in Taipei an official declared that the output of its Taiwan Sugar Company had risen 398 percent since 1946. That postwar year was rock bottom,

A Tawan Businessman Matches Moon Lakeside Tea Stops from Lake to Lake

[illegible] Lake [illegible] made fabric [illegible] from the outside [illegible] one has paved with two upper teeth [illegible]

[illegible] and production still is far below the prewar level.

Most industries and cities get their light and power from the Sun Moon Lake hydroelectric plants, pulsing [illegible] 168). This lofty lake [illegible] the plants themselves [illegible] soldiers warned [illegible] away.

Here the Generalissimo [illegible] one of his mountain aeries, alternating his [illegible] Sun Moon Lake and sulphur-smelling Tsaoshan, hot-spring resort in the mountains south of Taipei.

Formosa Faces an Uncertain Future

On a day of alternate sun and rain we jeeped among the dead volcanoes that look down on Tsaoshan. In a small [illegible] valley workmen were extracting [illegible] tals from sulphur laden waters. On the mountainsides grew tiers of tea shrubs and orange [illegible]. When we stopped at a roadside inn, a phonograph struck up "Anchors Aweigh" and "The Caissons Go Rolling Along" in our honor.

Over a steep overgrown road we drove to the crest of a grass-covered mountain. No [illegible] this road, a secret one used by the Japanese in wartime. Far below lay the [illegible] city, in the wide, shallow valley of meandering rivers, the Tanshui and Chilung [illegible] the latter, road and rails ran toward Chilung, the capital's port.

What did the future hold for [illegible] scene of a bloody prewar [illegible] Nationalists, goal of Communists, prize coveted again by Japan, lying squarely between United States bases in the Philippines and Okinawa? Across the green land the rivers wrote pr[illegible]

So Much Happens Along the Ohio River

By Frederick Simpich

[illegible] Kodachrome Photographs [illegible]

I'VE been on the Amur, the Amazon, and the Rio de la Plata, on the Tigris, Thames, Nile, Rhine, Euphrates, and Ganges; on the Yangtze, the Yellow, the Pasig; on all America's great streams; even on the River Jordan, from Galilee down to the Dead Sea. But I've never had a river trip before like cameraman Justin Locke and I have just made down the singularly fascinating Ohio. It's full of surprise and the unexpected!

From where the Ohio forms, at the confluence of the Allegheny and Monongahela Rivers at Pittsburgh (page 189), it flows south and west for 981 miles, to where it joins the Mississippi at Cairo, Illinois (map, pages 180-181). This noble stream's rich basin covers some 200,000 square miles, is home to some 20 million people, and includes 150 cities of more than 10,000 population.

Up and down this historic Ohio, Locke and I flew in planes. Along its winding course we drove in cars, and crossed it on old-fashioned ferries. We rode its powerful towboats that push gigantic barges of coal, new automobiles, oil, sulphur, steel, and other bulk cargo.

We rode its excursion steamers (page 210) and visited with theatrical folk who sing, dance, and play melodramas on its glittering showboats. We spent days in pilothouses with veteran skippers and ate many meals with deck hands, harking to their Munchausen river tales.

We talked with folks who live along its kaleidoscopic banks, from soap kings and steel barons to bankers and shanty-boat idlers - who act as if any garden truck growing near the river's edge, or any foolish frying chicken that ventures too close to the water belongs to them.

A Mysterious Inscription

Always, the unexpected. If Robinson Crusoe was upset when he found Friday's footprints in the sand, think how astonished that young Indian boy was at a mysterious inscribed lead plate he found in the mud while swimming near the Kanawha River. It was one of a half-dozen buried along this river in 1749 by the French explorer, Céloron de Blainville (Blainville).

Blainville planted them to prove he had been here, and claimed this land for his king - just as the sons of Frenchman Pierre La Vérendrye planted a similar plate near Pierre, South Dakota, in 1743. That plate lay on the wind-swept Dakota hills for more than a century and a half, till schoolgirl Hattie Foster found it.

This whole valley is dotted with oddly formed earthworks left by the Mound Builders, American Indians who built mounds for burial, defensive, and dwelling purposes.* At Turpin Site, near Cincinnati, Locke made pictures of scholarly grave robbers, busy with picks and whisk brooms, juggling the bones of men long dead in the name of science.

In centuries to come, maybe others will investigate the tombs at Arlington National Cemetery, or dig in that old Boston graveyard to learn the shape of the skull of Mother Goose!

From Stone Age Tools to Steel

Farmers hereabouts sometimes plow up smoothly polished stone tools made by these Mound Builders. By odd coincidence, men still make polished tools here; but they're machine tools now, made of steel, and in Cincinnati has grown up the greatest machine-tool-making trade in the history of civilization.

And this river, where the Mound Builders launched their canoes, has become the busiest cargo-hauling stream in all our 25,000 miles of navigable inland waterways (page 188).

For smoky leagues below Pittsburgh, factory chimneys now punch the dirty sky where once grew tall forest trees.†

"Smoke!" snorted a coed from Hiram College, Hiram, Ohio, one of a troupe with whom I had dinner on the showboat *Majestic* (page 179), then playing at Wheeling. "Besides sweeping up after every show, we girls do our own laundry. In one sudden squall the lifeline on our top deck broke and all our clean clothes blew away. We make our own beds, too, but every night that smoke settles down like fog. We get black!"

Her class in dramatics chartered this boat for the summer. In the company were 29 boys and girls, directed and chaperoned by

* [illegible] "The Southeastern United States" by Matthew W. Stirling, January, 1938, and "Indian Village [illegible] Ohio," by H. C. Brown, July, 1931.

† See "Pittsburgh, Workshop of the Titans," by Albert W. Atwood, National Geographic Magazine, July, 1941.

Learning How Stone Gibs, Senator and Mrs. Robert A. Taft Pause For a Chat with Reporters

[illegible]

[illegible] Kaiser [illegible] the work on the [illegible] Colorado [illegible] the stage were [illegible] Dorothy [illegible] Hollywood [illegible]

When [illegible] up on the [illegible] Dr. [illegible] Bill Raymond [illegible] and I Love an Orchid [illegible] hours [illegible] the [illegible]

[illegible] the Theatre [illegible] Lane [illegible] with [illegible] people [illegible] down [illegible] backstage, [illegible] the [illegible] *The Diamond* [illegible] all [illegible] behavior [illegible] of [illegible] and [illegible] workmanship [illegible]

A Pioneer Highway

[illegible] of [illegible] Wheeling [illegible] Route 40, the pioneer National Road.

[illegible] was the first big highway [illegible] St. Louis and [illegible] to California. [illegible] night [illegible] crowded [illegible] with [illegible] and [illegible] voices [illegible] Mr. [illegible] and Mrs. [illegible]

When [illegible] well, [illegible] dolls or [illegible] of [illegible] Glass [illegible]

[illegible] and [illegible] hills [illegible] years [illegible] Mrs. [illegible]

[illegible] Wheeling [illegible] Museum [illegible] lower [illegible] the [illegible]

The Wheeling [illegible] Mansion [illegible] Steel [illegible] Stamp [illegible] from [illegible] Dry Central Theatre [illegible] warmed by [illegible] people were there.

Then a young soprano on stage, with the zeal of old-time revivalist singers, put her [illegible] voice into *Leave, Stay Away from My Door*. Spellbound, [illegible] audience listened. Maybe the river did, too; anyway, it gently but slowly receded.

But it's the Ohio's value as a means of transport, rather than its history, which [illegible] modern Wheeling. Here one giant operator [illegible] the powerful Wheeling Steel Corporation.

[illegible] towboats [illegible] chets of the [illegible] since 1884. It ships steel by water from here to Minneapolis, Chattanooga, [illegible] and overseas on the Thames [illegible] Canada. Odd items have been steel for Panama Canal locks and [illegible] of the Matsu bans in Tokyo. It [illegible] barbed wire [illegible] from Texas [illegible] and nails for lumber camps in Amazonian rain forests.

Commercial geogra[illegible] Listen: Thi[illegible] tin from Singapore; here it makes tin plate, which [illegible] thin sheet iron coated with tin, and ships that to Honolulu, in the Pacific, where tin cans [illegible] pineapples and juice are made. Some of the same canned fruit product comes to Wheeling grocery stores, which means a second trip here for the tin.

Even that yellow smoke from its coke ovens [illegible] of trucks [illegible] Alabama [illegible]. From it come every color, flavor, and odor you can [illegible] [illegible] TNT, paint, moth balls, carbolic [illegible] nylon for synthetic silk; rubber; even artificial [illegible].

[illegible] Deer, to get salt, hung around deer licks along the Ohio [illegible] settlers got salt by evaporating water [illegible].

"Say, Mister Clown, Is That Your Real Face—No Foolin'?"

[illegible] West Virginia, venture to the water front as a [illegible] up. After the parade, to draw a [illegible] the showboat's [illegible] steam piano plays *Let [illegible] Over the [illegible]*. [illegible] the wave is a shade miles [illegible]

Fabulous Salt Beds Underlie Riverbanks

Now fabulous industries grow from vast new-found [illegible] upper Ohio Valley. For years men bored [illegible] for oil and [illegible]. Instead of oil, they hit this 120-foot bed of salt, at a depth of 6,830 feet. It is extracted now as brine, by forcing water down into the wells.

[illegible] the process, this is separated [illegible] chemicals, especially chlorine

This helps make vitamin pills, dyes, salts, drugs; also, it is used in purifying water.

How versatile salt is! I paid my way into a show in Somaliland with a chunk of rock salt. At the dirty tent door was a barrel into which you dropped your "ticket."!

One ton of salt is worth about $20. Think, then, what this astounding, more than 120-foot-thick Ohio Valley deposit is worth.

It's a newsreel of American life to sit up in the wheelhouse, binoculars in hand, and ride down the Ohio on a towboat. "That's how I saw the upper river, aboard the *Neville* of the Union Barge Line. Capt. George McCulloch, my host, gave me his guest room—cabin and bath like ocean-liner quarters.

Through his "bull horn" loud-speaker the captain could yell at people on riverbanks. Once, passing a picnic party ashore, I took my hoarse duck call, made by the champion duck caller at Stuttgart, Arkansas, and "went like a duck" over that bull horn. It magnified the ducky voice till it sounded like frightful quacks from a drake big as a dinosaur—all to the huge delight of small boys at the picnic.

One day we saw a washtub, full of women's clothes and with a washboard standing in it, sailing gaily downstream. "What's the strangest thing you ever saw floating in the river?" I asked the pilot.

"That tub, I guess," he said. "Also, I've seen haystacks with chickens on 'em, houses, lumber, trees—and once we saw a fat sow, swimming. The boys roped her and sold her to a butcher at the next landing for $30."

A "New Look" Chemical Plant

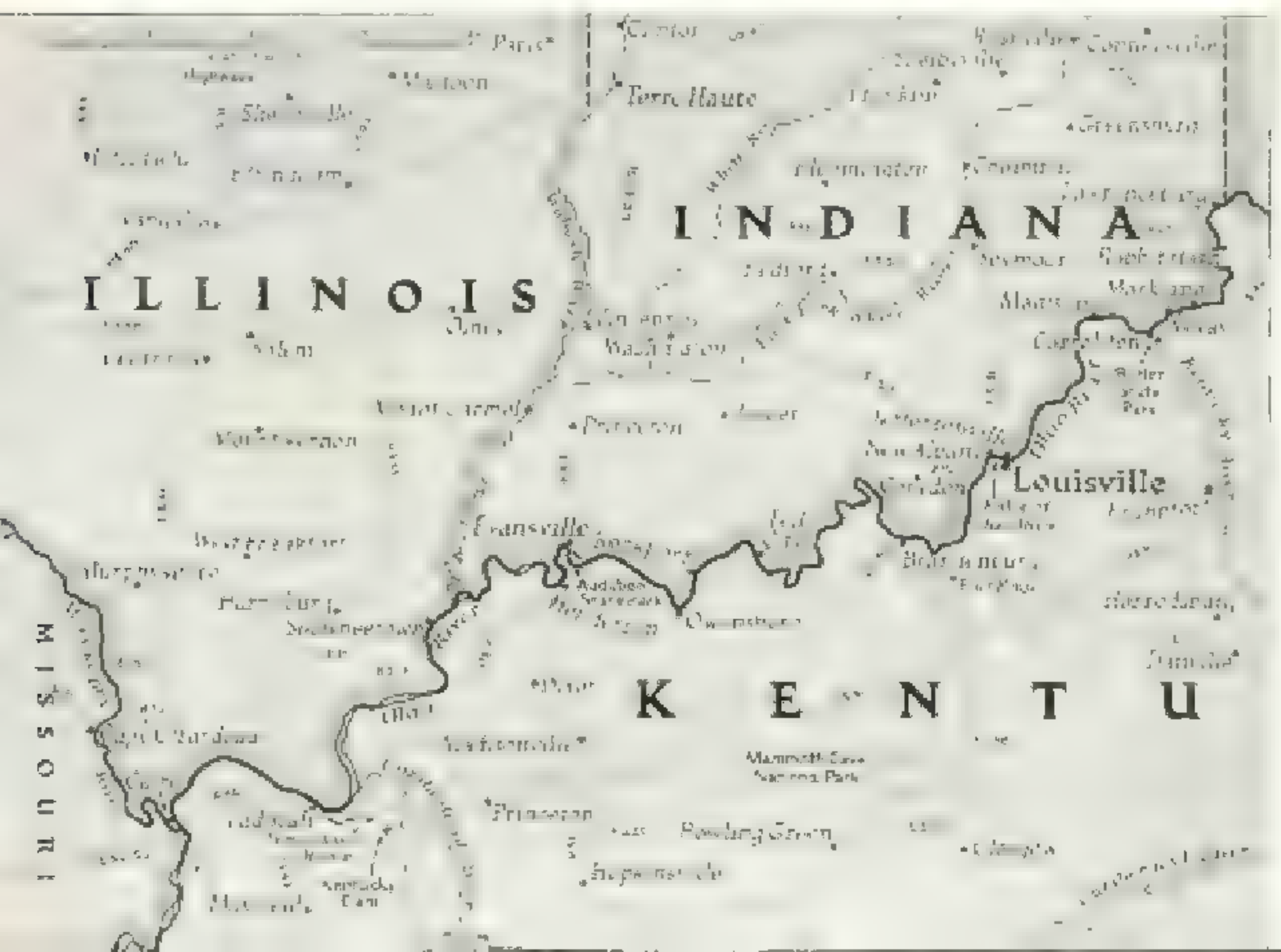
At Willow Island we passed the "new look" chemical plant of the American Cyanamid Company, more like the stately pleasure domes of a Persian palace than old-time [illegible]

To see its famous River Museum we went ashore at Marietta, Ohio, oldest white settlement in Ohio, and first seat of government of the Northwest Territory.

Its river relics, boat models, and faxing documents reveal the saga of this great stream, just as Cairo's museum tells the story of Egypt. They showed us the model of one vessel built here more than a century ago to haul corn to Ireland during the great famine.

From Russell, Kentucky, and near-by Huntington and Kenova, West Virginia, coal moves in astronomical heaps. About old coal mines waste slate and mine refuse pile in drab, mo-

"See 'Ohio, the Gateway State,' by Melville Chater, NATIONAL GEOGRAPHIC MAGAZINE, May 193[illegible]



notorious ridges, bare and [illegible] sand dunes. At Huntington, [illegible] works of the International Nickel Company, [illegible] with voluminous output of Monel metal.*

At [illegible] Government Lock 29, and the fine pool it forms. Ashland with its rolling mills, Semet-Solvay coke plant, [illegible] yards, and leather-belt factory, is the most important city in eastern Kentucky.

Hounds barked somewhere ashore in the dark as we passed Ripley, Ohio. "Same dogs that chased Eliza," joked a deck hand. "Here's where she crossed the ice, in *Uncle Tom's Cabin*."

At Parkersburg, West Virginia, the Little Kanawha flows into the Ohio. Here George Washington came in 1770, to locate lands awarded him by Governor Robert Dinwiddie of Virginia, for military service.† Here, too, one Robert Thornton claimed land by "[illegible] hawk entry", that is, he just chopped notches in trees around the land he chose.

This town got fat from oil wells. Now it makes oil-field machinery, and Ames steam shovels, advertised as "the shovel that built America." This slogan is based on [illegible] Ames shovels, first made in Massachusetts, dug trenches at Bunker Hill.

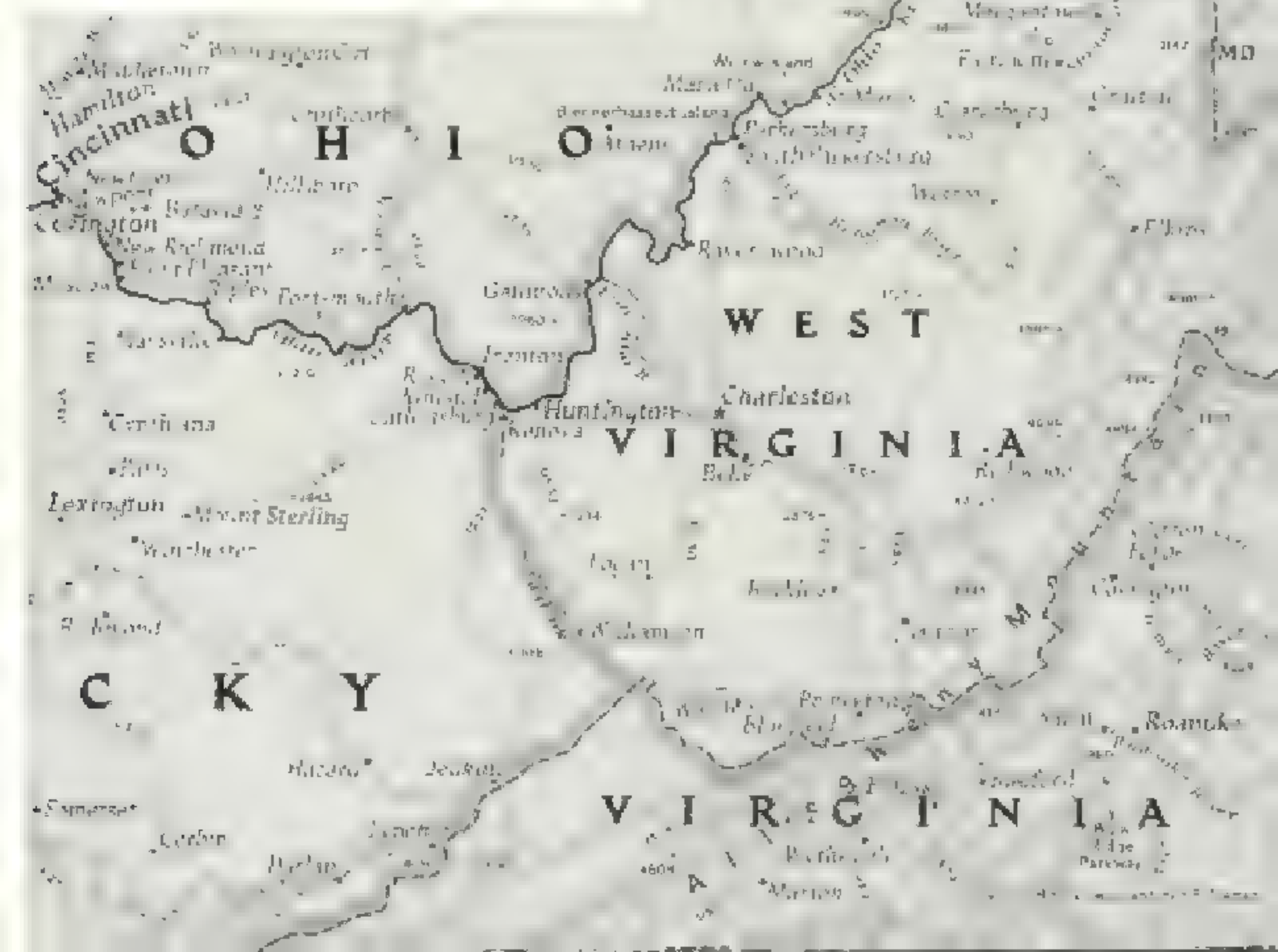
Downstream is Blennerhassett Island. To this remote spot came that cultured Irish exile, Harman Blennerhassett, to hide from his homeland's gossip after he had married his sister's daughter. Here he built his mansion, and entertained Aaron Burr.

A Contrast in Edifices

All signs of the romantic adventurer's once luxurious palace are now vanished. But some of Blennerhassett's furniture is preserved in the Congress Martius State Memorial Museum at Marietta.

* See "West Virginia: Treasure Chest of Industry," by Enrique C. Canova, NATIONAL GEOGRAPHIC MAGAZINE, August, 1943.

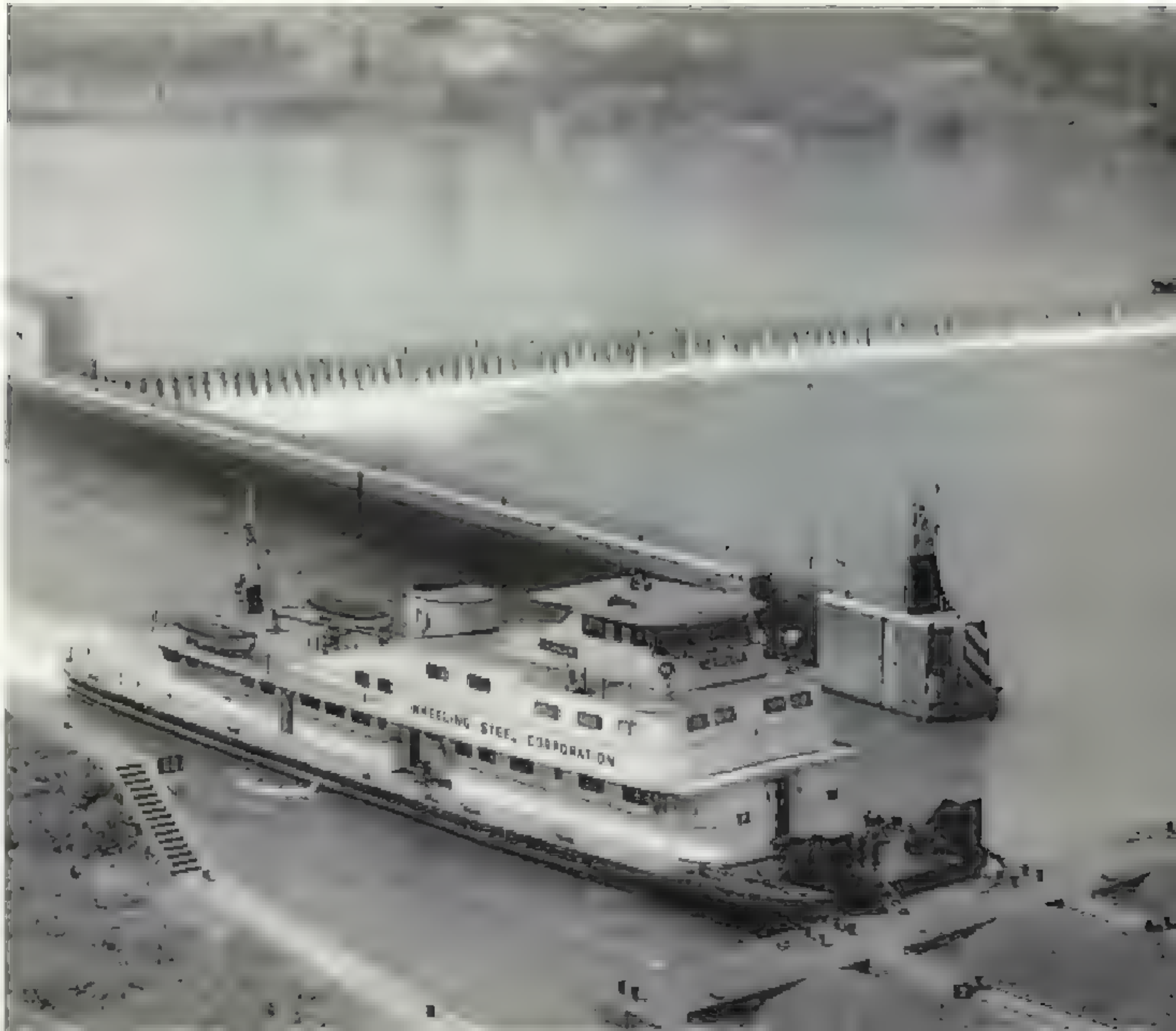
† See "Travels of George Washington," by William Joseph Showalter, NATIONAL GEOGRAPHIC MAGAZINE, [illegible]

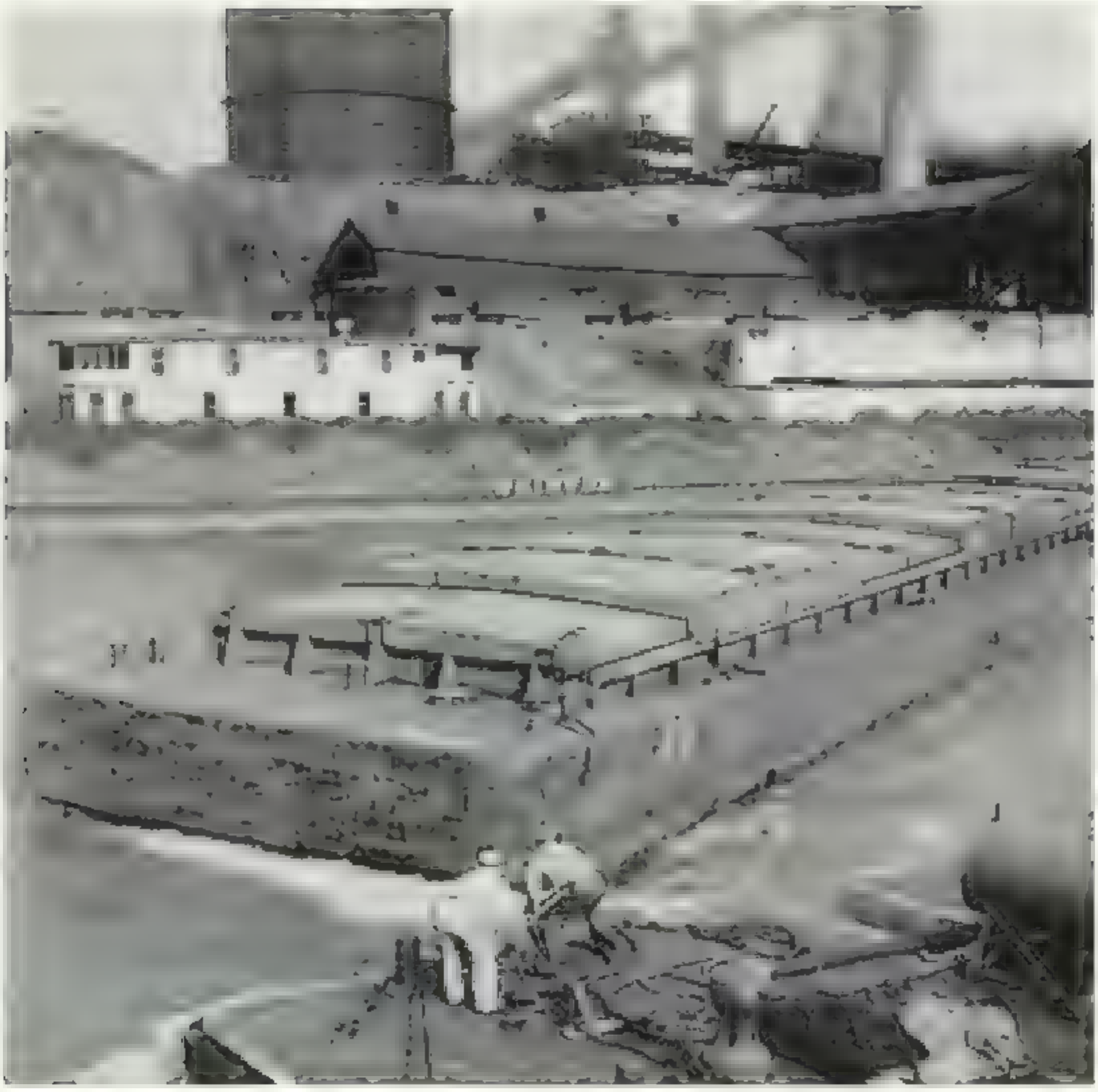


Through the Ohio Floodwaters Overlooking Houses, Red City Stands Safe and Dry Behind Its Walls

[illegible]

Yachtlike Motor Ship *La Belle* Passes Her Coal Barges Through a Lock above Steubenville, Ohio





Kodachrome from © Standard Oil Company (N. J.)

"Watch out! She's Coming Fast!" Cry the Crewmen as Their Towboat Picks Up a Barge

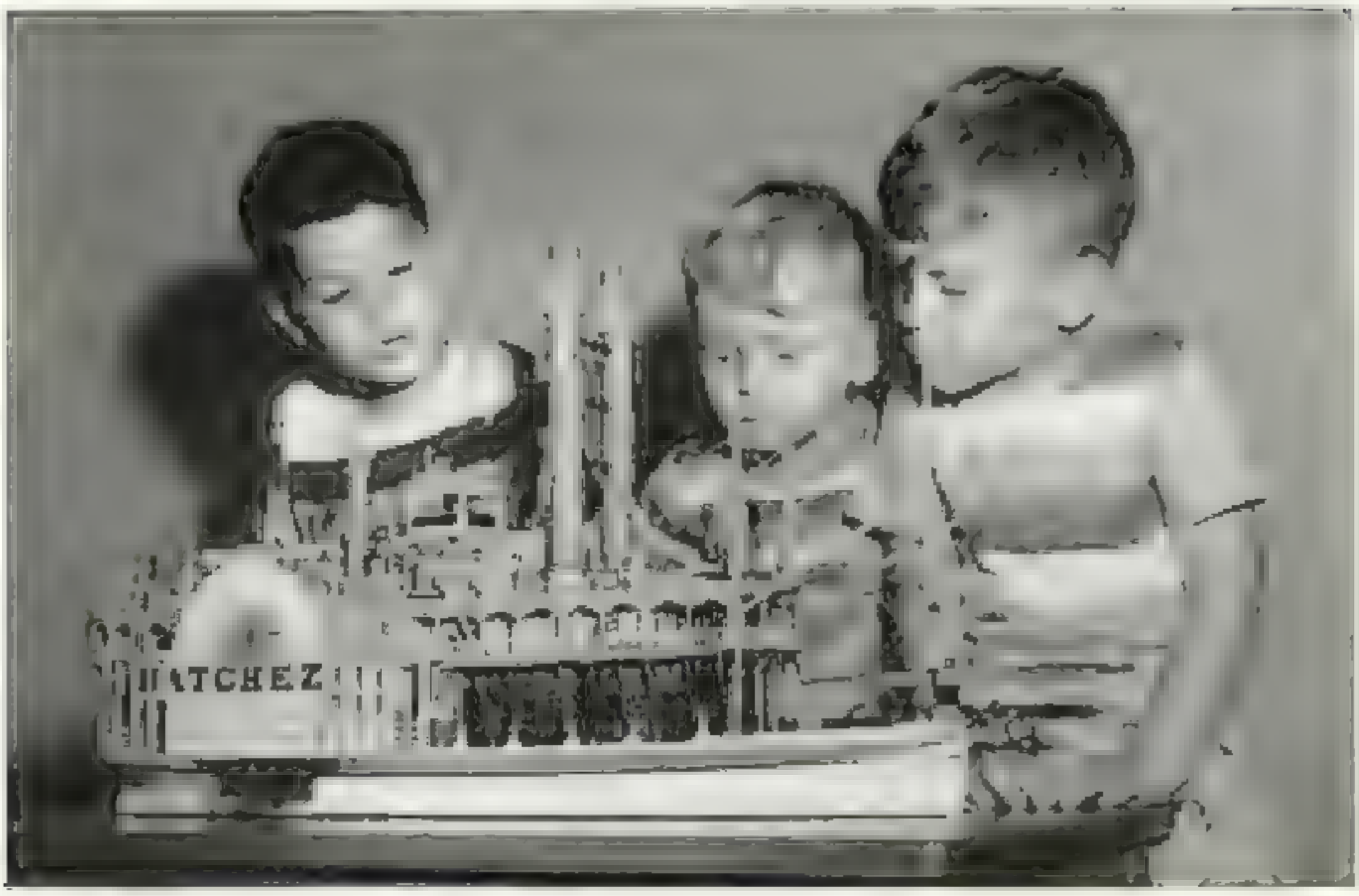
Skillful as a rowboat with a [illegible] one deck hand has just tossed a line over the bulkhead of the barge and [illegible] it in at Weirton, West Virginia. Now [illegible] fast, since such barges are heavy and hard to [illegible] [illegible] barges up [illegible] drop barges [illegible] up others [illegible] turns do from [illegible]

When [illegible] coming from West Virginia or Kentucky into Ohio and Indiana [illegible] the difference in people's [illegible] and dress. On a Maysville, Kentucky, street corner one Saturday I heard a fair woman invite another to a Jesse James movie. "I'd like to, but I promised it," answered the other. "But I am going home and pull seven cows." I repeated that phrase to an Ohio schoolteacher; she didn't know that to "pail" a cow means to milk her.

Men born on riverbanks tend to stick there, though they may move up and downstream from one river town to another. These river towns breed a river-going group, too, just as seaports spawn sailors. Pilots told me, also, that rivermen usually marry river-town women.

The flood of 1937, which the late Col. Albert W. Stevens and I saw from the air, when all those whiskey barrels broke out of distilleries below Cincinnati and floated in countless miles downriver, nearly ruined many small river towns, such as Maysville, Ohio.

[illegible] "Men Against the Rivers," by Ferdinand [illegible], National Geographic Magazine, [illegible], [illegible].



Fascinated Small Boys Study a Model of the Famous Steamboat *Natchez*

The hot-le race between the packet [illegible] the *Robert E. Lee* still lives in [illegible] and story. On June 1, 1870, the two steamboats left New Orleans [illegible] in a race that was [illegible] the world round. Neck and neck they puffed up the Mississippi, greeted by cheering river folk along the [illegible]. When the *Lee* reached St. Louis first on the Fourth of July, so great was her [illegible] that she won [illegible] the dinner crowd [illegible] her decks. The model built by the mates of the *Natchez* is on display at the University of Cincinnati [illegible]

In nearby Point Pleasant is the cottage where Ulysses S. Grant was born. It holds his Bible, cradle, West Point trunk, and cigar case.

New Richmond is just downstream. Here the same flood wrecked 225 homes and swept them down river. Judge John W. Hausermann, "gold king of the Philippines," lives here. I knew him in Manila, where he made his fortune from Benguet Consolidated Mining Company. He telephoned from Baguio, Luzon, when he heard of the flood, to offer aid to this his beloved old home town.

We [illegible] under a magnificent suspension bridge at [illegible] it connects the [illegible] railroad center with Kentucky (page 142). From vast Norfolk and Western Railway shops, from steel mills and factories that make [illegible] lanes, and stoves, it [illegible] Like some other river towns [illegible] its concrete flood wall gives it a fortified look.

Mound Bottom [illegible] their work here. Sight-seeing [illegible], "Where is the Julia Marlowe house?" It is an old house on Front Street. Its first floor was once a saloon, run by the actress's mother. Julia Marlowe (real name Sarah Frances Frost) lived here as a child, went on tour at twelve with a *Pinafore* company, later achieved world-wide fame in Shakespearean roles.

At Cincinnati we tied up [illegible] up from New Orleans [illegible]

Dams Turn River into String of Lakes

After [illegible] rivers [illegible] its tributaries.

Maj. Gen. J. C. Mehaffey is Ohio River Division Engineer; with that river, and its main tributaries, he rules over 3,195 miles of waterways. This system threads through 14 States; on it are built 158 navigation locks and dams, 46 of them on the Ohio. They help halt floods and assure flow of commerce.

We clewed [illegible] Ohio [illegible] long "log down" when the river [illegible] boats sailed over them. [illegible] on hinges are stood up [illegible] of timber wickets. This turns the river into a string of "navigation pools" [illegible]

from pool to pool, up or downstream, boats go through locks (pages 183 and 187).

The river used to get so low before pools were formed, that boats stuck on sand bars. "I remember," said Capt. William S. Chandler, veteran pilot, "seeing farmers ford the river by horse and buggy just above Madison, Indiana.

"Then our boats drew only 3 feet; today craft of 9-foot draught are common; because of growth in freight hauling, engineers now are studying a 12-foot channel.

"We were informal as milk-wagon drivers in the old days," said Chandler. "We'd stop wherever a farmer ran out and waved his hat or a lantern, if it was dark; we'd answer with a whistle toot, and run in to the bank. From among the willows a man might stagger out under the weight of a live calf, a shoat, or a basket of peaches. In ten minutes we'd be off again.

"Often," added the veteran skipper, "we'd stop at 'hay landings,' such as Markland, Indiana, and take on a pile of hay almost as big as our steamboat—for some city livery stable. We also ran Sunday excursions, with a chicken dinner thrown in, all for 50 cents!"

Barges and Towboats

Today's twin-screw, Diesel-powered towboats push 15 or 20 barges, which carry a dozen times as much freight as could ride a steamboat of the type Mark Twain steered (page 184). Downstream, they take steel, tin [illegible], and bring upstream oil, gasoline, sulphur, or sugar.

Famed "Big Mamma," or the *Sprague*, was for 45 years the largest towboat inland waters ever saw. Captain Chandler, once her pilot, recalls handling tows up to 60 barges each averaging 900 tons of coal. That was before locks were built. What he worried about then was making the channel between bridge piers without a smashup. And there are 53 bridges on the Ohio!

Hundreds of wrecks still lie on the river bottom. Clearing out those that impede traffic is a job for Army Engineers. Despite buoys, lights, and navigation markers put out by the U. S. Coast Guard Service, this is still a tricky river.

In 1942 the towboat *G. W. McBride* wrapped itself around a bridge pier at Cincinnati, sank, and drowned 16 men. In 1947 the steamer *Island Queen* blew up and burned at Pittsburgh, with 20 lives lost. No wonder you find fatalism and superstition among rivermen.

A man sank on the Ohio River the day I got to Newport, Kentucky. They couldn't find him. "Get one of his shirts," said an old river rat, "and throw it in where he went down." They did. The shirt floated downstream; suddenly stopped. "It just caught on a snag," scoffed some doubters. Anyway, police let down their grabhooks and brought up the dead man.

The true explanation probably is that the same eddy that caught the shirt had also pulled the man down.

All rivers seem to spawn superstition. I saw Chinese on the Hai at Tientsin refuse to aid a man who fell overboard, saying river devils had claimed him; hence, bad luck to interfere. If you're rowing on the Tigris with your wife and a fish jumps into your skiff, the boatmen grin and congratulate you. A sign, they say, that you will have a son.

From Cincinnati we went down to Cairo, Illinois, by the passenger boat *Gordon C. Greene*.

Again I haunted the wheelhouse with skipper and pilots. Using searchlights, we ran at night. When my colleague, Melville Bell Grosvenor, made this trip downstream on an LST his craft tied up at night. When they lay under overhanging riverbanks, cows and pigs came, stared curiously down at them, bawled and grunted.

During the war more than 1,000 deep-water vessels were launched from Ohio River shipyards for Army and Navy use (page 198).

This three-day trip to Cairo cost $50—floating hotel rates. Rain came in torrents at Louisville, so nobody went ashore. Happily, it cleared when we went through locks at nearby Falls of the Ohio, and we made pictures.

Paducah a Walled City

Only town we stopped at in daylight was Paducah, Kentucky. I'd last seen it after bad floods. Then skiffs tied up at Irvin S. Cobb Hotel; and a drowned mule lay on a man's porch. Now Paducah, like ancient Damascus or Baghdad, is a walled city. When I lived at Baghdad, we shut gates at night to keep out camel-stealing man-killing nomads. Paducah, also closes its gates; but to keep out rushing waters, not robbers.

Near Paducah, too, the Tennessee flows into the Ohio. Above its mouth rises the giant Kentucky Dam, forming a magnificent lake about 185 miles long.

At Cairo we said good-bye to the *Greene's* singing, fiddle-playing guests. I returned the guitar I had borrowed from a Mexican boy in the ship's orchestra, and went ashore.

Lock Tenacious Close Gates Behind the Steamwheeler *Orion*, Bound up the Ohio

From Dr. [illegible] to the [illegible] Lock to Steamer [illegible] Bound up the Ohio. The [illegible] Lock [illegible] Steamer [illegible] Lock [illegible] Steamer [illegible]

This Streamlined, Triple-deck Bridge, Loaded at Cincinnati with Newly Cars and Trucks, Can Carry Up to 500 Vehicles at One Time

[illegible]

Pittsburgh's Golden Triangle Glowers at Night Like a Fairy City. Here Allegheny and Monongahela Rivers Meet to Form the Ohio

This Confused-looking Contraption Wastes Dust from Illuminating Gas

[illegible]

Sack Chest Plowed and Hauled for Early Ohio Valley Settlers

Making and Decorating Pottery, One of Many Ancient Arts

A Modern Tom Sawyer and Huckleberry Finn Envy That Pilot Who Sees Poundls at His Wheel and Pulls the Whistle Cord

[illegible]

In Crash Helmets and Life Belts Speedboat Demons Tune Up Engines for Fourth of July Races at St. Marys, West Virginia

[illegible] Indian racers [illegible] pocket [illegible] War [illegible] World War II [illegible] Dead [illegible] Ohio [illegible]

Kappa Kappa Gamma Girl, In Polka-dot Scarf, Is Now a Powers Model

The Ohio and the Mississippi flow past Cairo on its east and west flanks (page 199). Completely flood walled, it hasn't been crowned out in decades. Standing as far south as Tunis, Africa, it is a lush cane and cotton center, and it plays golf at the Egyptian Country Club.

Here are two major highway bridges, one crossing the Mississippi to Missouri, and the other over the Ohio into Kentucky. Here, too, the Illinois Central Railroad crosses the Ohio on a fine bridge which is also used by the Gulf, Mobile & Ohio Railroad. Train, truck, bus, and automobile north-and-south traffic is heavy.

On the water front are a few old red-brick buildings dating from antebellum times when this was a busy port of call for the packet boats. At one time in a housing shortage many people lived on houseboats. There was even a floating hotel and one big floating store which held merchandise as well as a bakery, butcher shop, barber shop, and even a "daguerreian artist."

In 1854, 3,798 steamers called here, and in one year more than 60,000 cattle rode up the river to Cairo from Texas.

Gen. U. S. Grant, early in the Civil War, had his headquarters here. Gunboats assembled here for duty in that fratricidal strife, and from here Grant's forces were sent out to fight the Battle of Shiloh.

"Cairo is a brisk town . . .," said Mark Twain in his *Life on the Mississippi*; but what Charles Dickens said about Cairo in his *American Notes* need not be repeated.

By both car and plane now, Locke and I worked our leisurely way back upriver.

Henderson, Kentucky, on high red bluffs, faces a mile-wide River. During his eight years here Audubon, the naturalist, kept a store near his frog and turtle pond. Later he ran a mill in the area. Today there is a bird refuge near here in his honor (page 201).

The front door of historic Lockett House still shows dents made by gun butts when Union soldiers tried to gain entrance. A romantic tale says they were called off by their captain, when he learned Mrs. Lockett was a former sweetheart.

Evansville, Indiana, near Henderson, kicks bustling north with the more leisurely life of rural Kentucky. Its busy Mead Johnson river, rail, and highway terminal handles mountains of freight. From here move great tonnages of pork, furs, lead, salt, powder, etc. Today, from more than 200 factories, come refrigerators, cranes and steam shovels for oils and tile, baby food, aprons, bottle caps, uniforms, brooms and paint.

Once our papers carried a strange story that came out of Rockport, river hamlet southwest of Evansville. There, from the mud, the skipper of a dredge hauled up a man who seemed turned to stone.

Woman Said Petrified Man Was Her Husband

That was back in 1902, not so long after P. T. Barnum's adventure with the famous Cardiff Giant. This "petrified man" also became a museum attraction. He wore a wedding ring. One widow claimed him as her long-lost husband who had, she said, been slain and thrown into the river. She went to court to try to get the ring.

Years later the dredge skipper confessed to how the "petrified man" secretly made in a stonecutter's shop, sank in the river, and then "dis-covered" it.

At Owensboro on the Kentucky shore, the 101-year-old Planters Hotel preserves a faded register with signatures of Jenny Lind and other famous folk. This is a busy tobacco sales and factory center. It makes whiskey and light bulbs; lost some prominent men at the Battle of Tippecanoe; and saw its share of Civil War raids and skirmishes.

In the old courthouse at Brandenburg, a hamlet upstream from here, are records hinting at pioneer social ways. One item says that though a poor boy named Henry Dawes is apprenticed to a Mr. Tarnstall to "learn the mystery of carding and spinning," his master is bound to give the boy meat, drink, and clothes, and see that he is taught reading, writing, and the "rule of three."

It was at Brandenburg that Confederate raider Brig. Gen. John Hunt Morgan commandeered two steamboats to ferry his men across to Indiana. From there they set off on those historic "Morgan's raids."

Jeffersonville, Indiana, was nearly all under water in the 1937 flood. Here the Army maintains an enormous Quartermaster Depot. About 2,000 steamboats were built here, some for Yukon River trade. From here crowds of people cross the river bridge every day to work in Louisville, Kentucky.

Clay Pit, in prison history, was Indiana's first penitentiary, built here and leased out to private operators. Its first lessee was killed in the Alamo, at San Antonio, Texas, along with Davy Crockett. Now it's a soap factory!

Hoosier history began along the river in this quiet region of singular beauty, where farmers still eat groundhogs, turn hand grindstones to sharpen their scythes and axes, and pour rain water over wood ashes, in a hopper, to get lye

"Swat It, Sis! You Can't Miss a Ball Thar Bigt"

[illegible]

[illegible] Mr. Hanks [illegible] up to scare [illegible] But it don't work. Still [illegible] and stole my [illegible]

[illegible] local herb [illegible] down to New Orleans [illegible] food [illegible] His mother, Nancy Hanks, [illegible] Indiana.

[illegible] Indiana [illegible] Mr. Mansion [illegible] paper [illegible] Mr. Mansion [illegible] *Young* [illegible] *Hoosier Poetry*. Old Uncle Mansion was [illegible] richest, biggest [illegible]

[illegible] of their way to [illegible] James S. [illegible] of the [illegible]

Rabbi Hash; Population, 50

[illegible] Hyam Kaufman, [illegible] "[illegible] Rabbi Hash." [illegible] made haste hence. Rabbi Hash

Down the river from here is Vevay, Indiana, founded by Swiss wine makers. In her cellar a fine old lady of French-Huguenot descent (now Mrs. James S. Wright) showed

In Cincinnati's Taft Museum the American Ceramics Society Stages a Flower Show

[illegible] the former home of the [illegible] Reynolds; smaller [illegible]

[illegible] Holmes [illegible] Rivers, [illegible] Vernon [illegible] most [illegible] called it "La Belle [illegible]

[illegible] and [illegible] [illegible] creek into a ditch of dirty water, [illegible] will not even tolerate love in it.

[illegible] "outlets" a skipper [illegible] crawling out of the water to [illegible] the [illegible] and [illegible] with [illegible] shoots half out of the water [illegible]

[illegible] Mrs. Wright [illegible]

When Mrs. [illegible] threatened us in [illegible] and Mrs. Wright [illegible] my aunt took a [illegible] water [illegible] up [illegible] bottle. [illegible]

[illegible] not to pay [illegible] and [illegible] let [illegible]

Keeping River Water Pure

Everybody thinks his own pet river the most beautiful. You hear that about the

Crowds Cheer and Men on Her Deck Grab the Rails for Safety as an LST Is Launched Sideways at Pittsburgh During World War II

[illegible]

The Ohio, Flowing in from Upper Right, Pours into the Muddy Mississippi, Left, a Short Distance Below Cairo (above)

In Sunbonnets and Stovepipe Hats [illegible] St. Marys Folk Share in Their Centennial

[illegible] the West Virginia town [illegible]

He showed me a photograph of a [illegible] boat.

Some river [illegible] that [illegible] "makes [illegible]"

In [illegible] of the Ohio River [illegible] to [illegible] their [illegible]

After talking about it for [illegible] years, Congress in 1948 passed a law [illegible] with the [illegible] Water Pollution Control [illegible] U.S. Public Health Service works with the States [illegible] Eight States in the [illegible] Ohio River Valley Water Sanitation Compact, and are [illegible] laws.

Now [illegible] factories that [illegible] into the rivers [illegible] treat their sewage properly.

[illegible] water [illegible] and

Forgetting [illegible] we [illegible] down [illegible] bridge from [illegible] Louisville [illegible] whiskey [illegible] Fort Knox.

The [illegible] we saw [illegible] pictures of [illegible] Brown Hotel [illegible] flood.

Louisville [illegible] was born of the river.

Here [illegible] Nelson [illegible] George Rogers Clark [illegible] Louisville [illegible] The young town was later named for Louis XVI.

"Look, Elvera! An Iceland Falcon, Painted by Audubon over 140 Years Ago"

Mrs. Arch Shelton, curator of the John James Audubon Museum, [illegible] some pieces of [illegible] elegant [illegible] Audubon. [illegible] architecture, this Kentucky town [illegible]

Here, [illegible] are the Falls of the Ohio. [illegible] with locks, was built with slave labor in 1830. Boats could not pass up and downstream [illegible] during high water; at other [illegible] had to be unloaded and cargo portaged [illegible] the falls [illegible]

[illegible] easily [illegible] passing craft in a rise or drop [illegible] feet.

Lifesaving Station at Falls

So dangerous are these falls that since 1881 the U.S. Coast Guard has maintained a Lifesaving Station here.

White fences frame famous Bluegrass horse farms along the highway from Louisville to Covington.

Near Carrollton lies scenic Butler State Park.

Upstream past Carrollton, the day we were there, went the 50-foot schooner S[illegible] a real "steam ship" owned [illegible] engineer. On board he had his wife and four children. They were making the cruise from Boston to Pittsburgh, via the tip of Florida, and had been [illegible] on the way. They had sent their [illegible] the boat, and planned to sell their craft in Pittsburgh and [illegible] proceeds.

Cincinnati stretches from hills on its [illegible] showing hills [illegible] like an old Rhine city. Unique among its industries is the making of prison cell blocks and X-ray machines for the whole world.

Dan Beard, of Boy Scout fame, lived here. Over a suspension bridge [illegible] by John A. Roebling [illegible] fame, crowds of Ky[illegible] each day in Cincinnati.

"It's always easier to find a job in a [illegible]

nati than in any other big city I know of," a truck driver told me.

Served now by eight railroads, this is a tremendously busy river port.

Its magnificent $41,000,000 Union Terminal is one of earth's most overwhelming architectural feats. It even has a game room, to divert those waiting for trains. Murals on its vast concourse walls dramatize the romance and adventure of civilization's westward march. So spacious is it that here even dog races might be run.

Cincinnati is the largest inland bituminous-coal trading center in the United States. One printing firm advertises that it makes "399 miles of envelopes a day."

From Tokyo to Timbuktu, when men shuffle and deal, the chances are they're playing with cards made in Cincinnati.

"In 1948 Americans alone bought about 57 million packs of cards," said M. A. Folkman, president of the United States Playing Card Company. "About four-fifths of all our people play or have played cards. Today most players are between 20 and 30. Many veterans learned while in the Army or Navy.

"New games usually have their genesis in old established ones," added Mr. Folkman. "Within the past 25 years contract bridge has become the leader. Its principles go back 400 years, in England.

"Whist began in the 17th century. From it came bridge, in 1896, and in 1904 came auction. By 1930, contract was the leader. The whist family is older, but it's doubtful whether it will ever reach the universal acceptance of many variations of poker, which lend themselves to individual play, as do those of the rummy family. In this latter group gin rummy was followed by Oklahoma, and now by Canasta."

I saw an old photo of a Cincinnati waterfront house where Stephen Foster clerked about the time he wrote *Old Suwanee*. In some such now shabby old buildings the city's most significant activity had its beginnings. That was the making of machine tools—tools to make other machines.

Here worked these skilled pioneers who made their own tools with which to build guns, sawmills, and gristmills, and bore cylinders for steamboat engines. Thomas Carlyle called man the "freatest of bipeds," but as a "tool-using animal" he can grind mountains into [illegible] and knead red-hot iron as if it were soft putty.

[illegible]ck V. Geier, president of the Cincinnati Milling Machine Company, says as early as 1800 a Cincinnati gunsmith was advertising his skill. By 1814 a steam engine here was running a mill to grind flour and weave cloth. Shipyards in 1819 built the *Eagle* and the *General Pike*, first all-passenger steam packets on the Ohio River.

"Today," says Mr. Geier, "Cincinnati is the world center for making milling machines, lathes, and planers; drilling, grinding, and cutter-sharpening machines; shapers, and boring mills. Such machine tools give men the mastery over power and metals."

Lawyer Charles P. Taft showed me daguerreotypes, made in 1848, with dozens of steamers crowding the river front. First Pennsylvania Railroad locomotives were built here. One early toolmaker, George A. Gray, Jr., fitted plates on ironclads built here; he also made a rapid-fire gun and demonstrated his model to Abe Lincoln, who said men were already being killed fast enough. Later, this gun, as the Gatling, was adopted by the British.

From Cincinnati go tools that make many of the machines the whole world uses, from south African gold fields to the sheep-shearing sheds of west Texas.

Ideas, Too, Shot Down This River

Cincinnati's mind was early in art and science because of the high intellectual quality of so many pioneers.

In 1806, when Jared Mansfield was surveyor general of the United States, instruments were sent to him here to survey the Northwest Territory. With these he made astronomical observations. Later, in 1843, Cincinnati established the first observatory founded by public subscription.

From this city's now century-old Literary Club went Ainsworth R. Spofford to be Librarian of Congress. Meteorologist Cleveland Abbe went from here to set up our Weather Bureau at Washington, D. C.

For 121 years Ohio Mechanics Institute, at Cincinnati, has set the pace and kept pace with new types of craft education. It has sent hordes of trained men to meet calls from all this city's enormous list of factories, which make many things, from soap and beer-barrel hoops to television sets and overalls.

Seriously, the University of Cincinnati (pages 194 and 207) joins classroom theory with actual shop or office experience. After his freshman year a student can study eight weeks, then work eight weeks, for pay, preferably in his chosen vocation.

Advent of many Germans affected this city's culture and character. It once had four German newspapers; for years German was taught in public schools. The elder Nicholas Longworth, who had developed vast vineyards on

Historic Lanier Mansion Faces the Beautiful Ohio at Madison, Indiana

[illegible]

Dressed Up Like Her Great-Grandmother

[illegible]

Angel-faced Twins "Toss" a Fancy Pony Coat

[illegible]

"You Can Go as Far as You Like with Me on This Merry Merry-Go-Round!" . . . Under the "Flying Saucer" Neon Lights

In Perfect Rhythm Ice Skaters Glide Above the Vast Arena of Cincinnati Gardens

▲ Cincinnati University Students Burlesque Black Magic Tricks of Medieval Times

[illegible]

▼ Famous Singers from the "Met" Appear in Opera-for Summer Opera at Cincinnati Zoo

[illegible]

At Neville Island, near Pittsburgh, Shipbuilders of Dravo Corporation Side-Launch a New 128-foot Hopper Barge for Hauling Coal

[illegible]

Hoosier Women Help Menfolks Shock Corn and Store Fodder for Winter Feed, near Corydon, Indiana

[illegible]

Excursion Crowds Gaze in Fascination at the Big Chickering Stern Wheel

these Rhinelike river hills, encouraged many Germans to migrate here. Today their influence survives chiefly in music (page 207). You see this in that great chorus of the biennial May Festivals first conducted by Theodore Thomas, the Symphony Orchestra, established in 1895, and in the Conservatory and the College of Music.

As if cut from Paradise itself, Eden Park rises above the city and encloses the Cincinnati Art Museum. Here are timeless works of Titian, El Greco, Murillo, Van Dyck, Rembrandt, Corot, Whistler, Duveneck, Sargent, Picasso, and others.

Priceless Cincinnati newspaper files, from 1793; diaries kept by pioneers; faded old letters; pictures of early steamboats and the city waterfront; some 50,000 books and pamphlets—all these and more are preserved by the Historical and Philosophical Society of Ohio in a fireproof library on the University campus (page 185).

To amuse and instruct children, Cincinnati's Museum of Natural History often packs some of its most striking exhibits in cases and takes them from school to school.

In this museum nothing attracts more attention than the amazing collection of South Pacific arts and crafts, presented by Mr. and Mrs. Julius Fleischmann.

The Taft Family

History often links noted men with certain rivers: Caesar with the Rhine, Capt. John Smith with the James, Washington with the Delaware.

Here at Cincinnati, beside the Ohio, the Taft family grew up. Though this family stemmed from Uxbridge, Massachusetts, it was from Vermont that pioneer Alphonso Taft came to the Ohio Valley. He rode down this river to Cincinnati in 1838 and went ashore to establish a home for the family that has since played such a high role in American public life.

Thus, Taffs are to Ohio what the Adams family was to New England, or the Washingtons, Randolphs, and Lees were to Virginia. Alphonso came from a family of carpenters, farmers, and self-made men. He walked from Vermont to Yale, and worked his way through.

In his new Ohio home he practiced law, learned shorthand from Benn Pitman himself, became Secretary of War and then Attorney General under Grant; and served as American Minister to the courts of Vienna and St. Petersburg.

William Howard Taft, one of his sons, worked briefly as a reporter for Murat Halstead's Cincinnati *Commercial*; in turn he was Solicitor General of the United States, U. S. Circuit Judge, Governor General of the Philippines, Secretary of War, President, and, later, Chief Justice of the United States. No other American was ever so exalted.

Another son of Alphonso was Charles Phelps Taft. He was elected to the 54th Congress in 1894. He was part owner of the Chicago Cubs, and for years published the Cincinnati *Times-Star*. He originated the use of leased wires for distributing news, and gave an endowment of one million dollars to the Cincinnati Symphony Orchestra.

He and his wife also gave their 30-room, 19th-century home to the city. It is now known as the Taft Museum (page 197). In its exquisite period rooms are paintings by Goya, Henry, Farny, Turner, Gainsborough, Lawrence, Reynolds, Romney, Corot, Rembrandt, Millet, and others.

Horace Dutton Taft, another son of Alphonso, founded the well-known Taft School for boys, now at Watertown, Connecticut.

Peter Rawson Taft was yet another son. His son, Hulbert, now is editor and president of the *Times-Star*. A fifth son, Henry W. Taft, was long a member of the noted New York law firm, Cadwalader, Wickersham, and Taft.

Sturdy, straightforward United States Senator from Ohio, Robert Alphonso Taft, is a son of former President Taft (page 178). His younger brother, Charles P. Taft, is a lawyer and public-spirited citizen of Cincinnati. At his tree-shaded Walnut Hill home, over an apple and within sound of his young son's cage of frolicking pet hamsters, we talked about Manila, after the "days of the empire." I had edited a paper there when William Howard Taft was Governor General and "little Charlie," his son, galloped a pony around the Luneta beside his father, also on horseback.

Later, President Taft named me consul to Jaffa. When I went to present my compliments and thank him, he said: "You wrote some editorials about my Philippine policies when we both lived in Manila. . . . I should send you as consul to Hades, if we had consulates down there. Anyway, I'm sending you to the next hottest spot I know—Baghdad on the scorching plains of Mesopotamia."

President Taft served on the Board of Trustees of the National Geographic Society for many years and wrote many articles for The Magazine.

All the Tafts went to Yale.

This city was and is home to writers of note. Harriet Beecher Stowe gathered material here for *Uncle Tom's Cabin*. Here too

All Paducah Turned Out to Greet Hometown Vice Presidential Nominee, Alben Barkley

[illegible]

[illegible] Mr. Barkley [illegible] *Courier-Journal* [illegible] Henry, George Rudolph Coffee, Thomas Jackson Read (who wrote *Sheridan's Ride*) and Washington McLean of *Louisville Courier-Journal* [illegible] were written for Clark's *Lifetime of the Greatest Free-Stage*.

[illegible] Mr. Barkley's [illegible] by [illegible] from the [illegible] down the Mississippi [illegible] that [illegible] up the Missouri from where many took the Santa Fe and Oregon Trails to Sacramento and the Pacific coast.

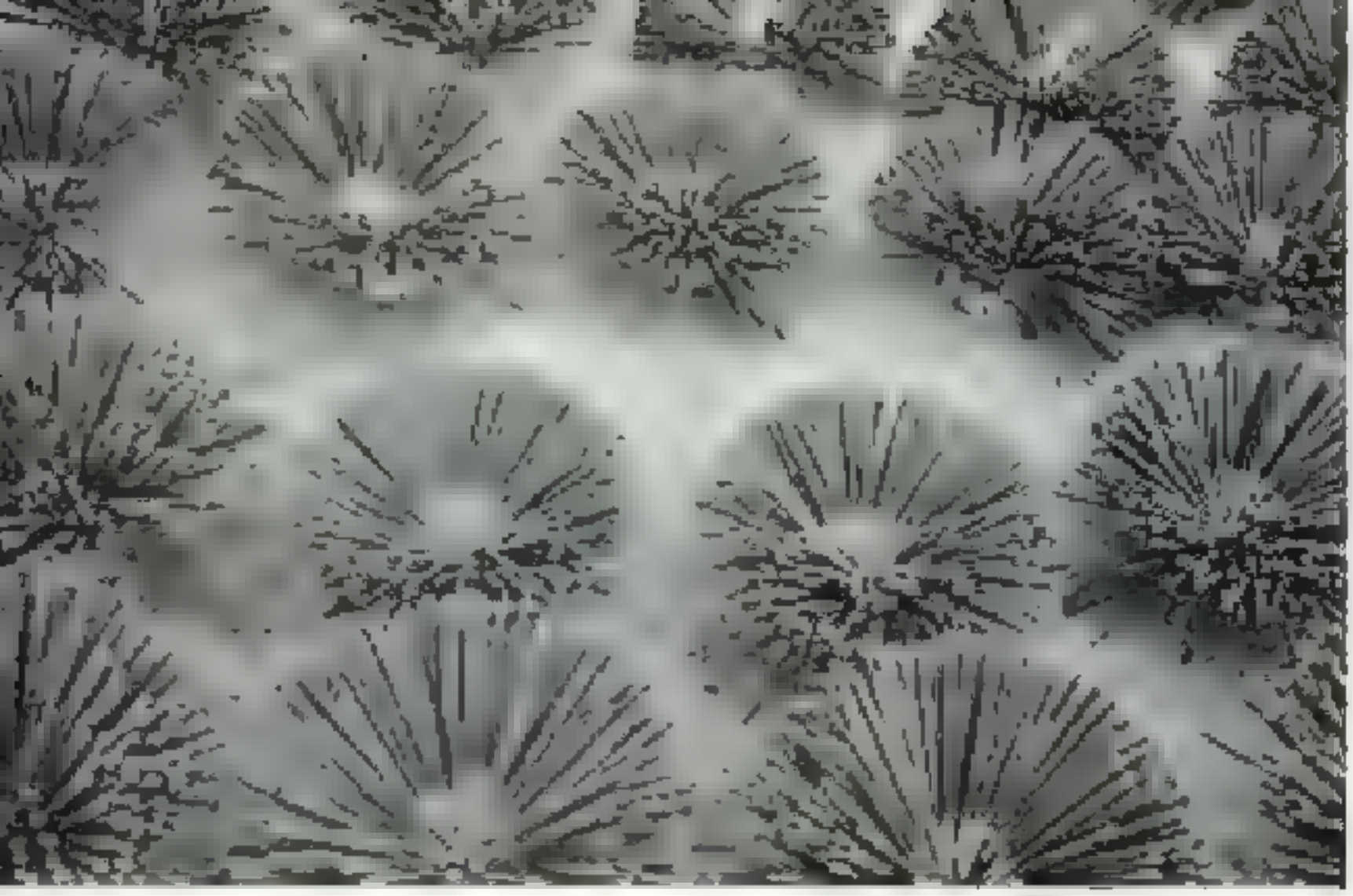
[illegible] Rivers of Clark were born [illegible] and up the Wabash with the Vincennes [illegible] help [illegible] from the [illegible] Northwest Territory. Some Presidents of the United States have come from the Ohio Valley [illegible] from the Cincinnati area. [illegible] Harrison has [illegible] from Northern [illegible] and [illegible]

Tonsure Pilgrims, Some with Tablets for Alms, Outside of Yunnan's Mountaintop Shrines

[illegible]

From the Topmost Temple Burning Incense Gathers Lake Mountain Vapor

Knowing Market Does Business in the Mud A Girl (Right) Pays with Inflation Bills



A "Pharaoh's Horse" Bristle with Incense Sticks; Buddhist Houses Held in Pressure

An Elderly Mona Rings a Temple Bell, Sounding the Call to Prayer

A Monastic Monk Selects Incense Tapers to Be Lighted with the Oil Lamp

Demon Chaser and Dragon, Partially Terrestrial, Guard a Temple of the Western Island

[illegible]

A Scowling Fortune-teller Reflects the Misfortunes Seen in Her "Crystal"

[illegible]

Vanderer and Begegnen Gemälde on the Trail of the Pilgrims

[illegible]

Two Soldiers Marvel at Gilded Statues in a Tunnel Wall

[illegible]

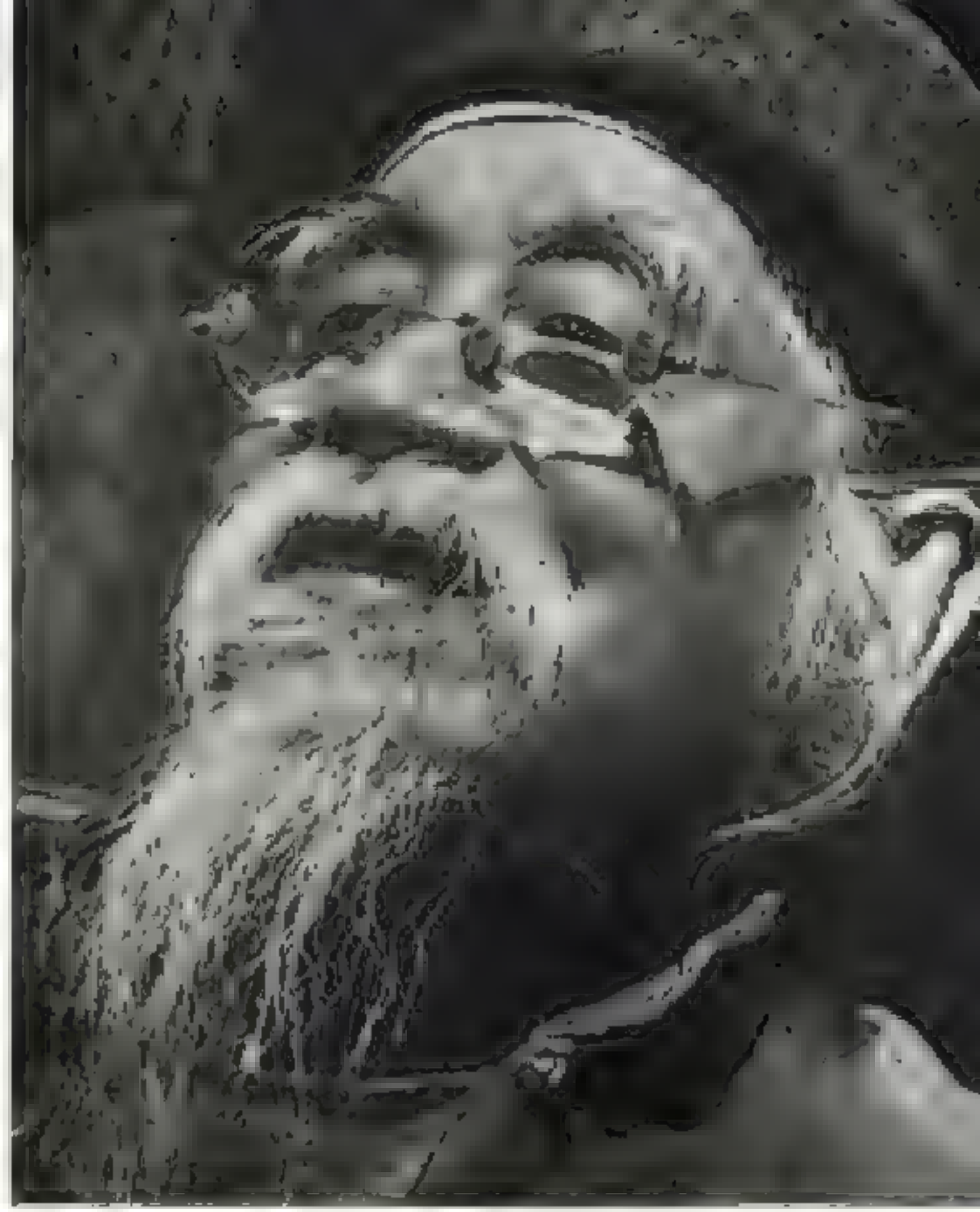
[illegible]

23.

Humanity's Crossroads, Treading a Mountain Trail, Pass Like Hurrying Streams of Ants

[illegible]

Tonsure Marks, Branded onto Shaven Heads with Burning Incense, Proclaim the Calling of Monks and Novices

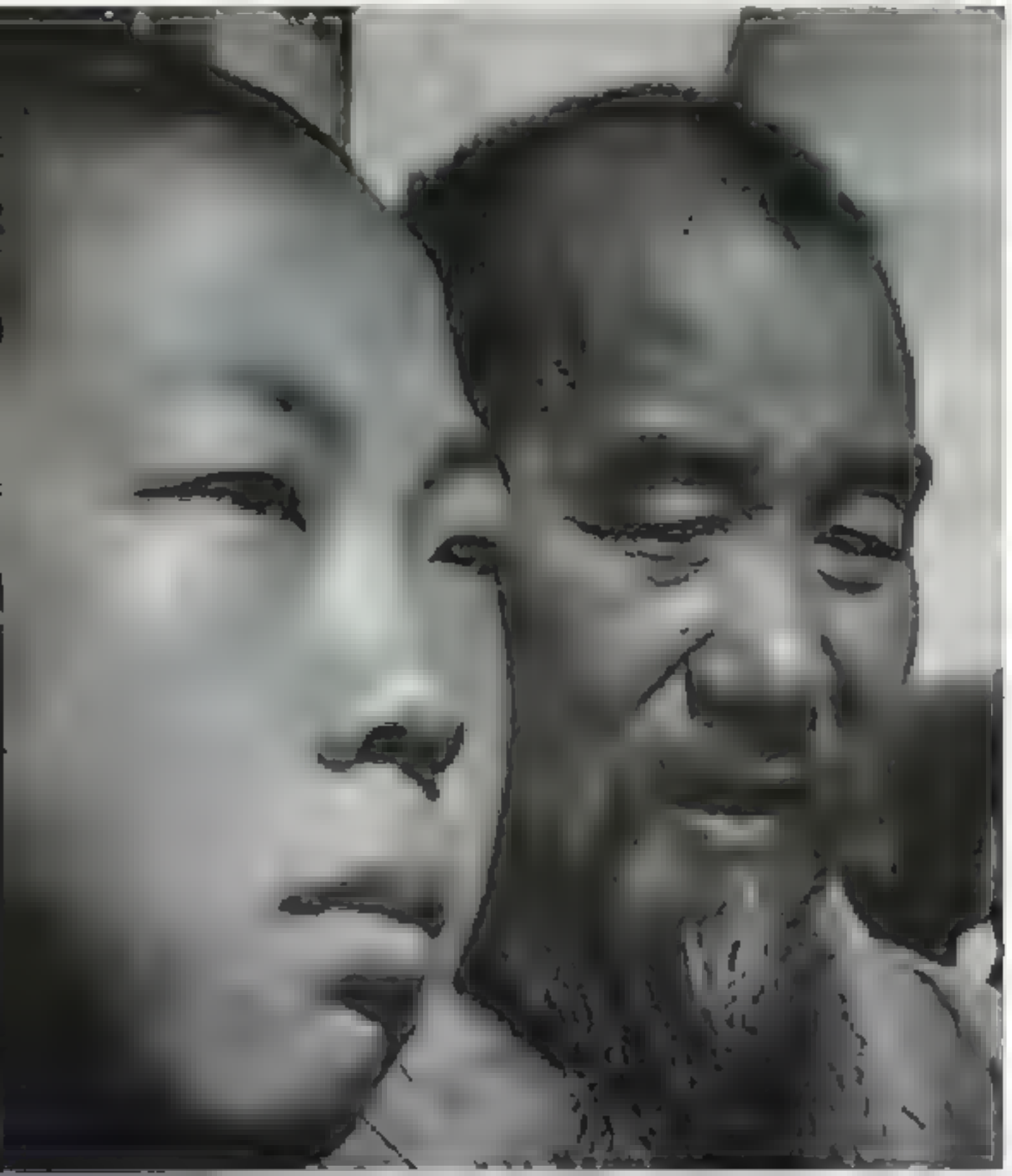


Spectacles and Whiskers Digitly an Herb Doctor

Two Generations: a Novice and His Abbot

[illegible]

[illegible]



A Serpentine File of Human Insects Staggers to Pharaohs' Goal: the Lost Temples

[illegible]

Exploring Ancient Panama by Helicopter

By Matthew W. Stirling

[illegible] National Geographic Photographer [illegible]

THE time was approximately the year [illegible] when the central cordillera of the Isthmus of Panama, a short distance east of what is now the Costa Rican border,

The great cone of the long-dormant volcano Chiriqui, towered 12,000 feet into the tropical air. At the bottom of the crater was a deep, clear lake. The upper part of the cone, where it penetrated into the cold zone, supported a sparse growth of stunted vegetation.

Lower down, the slopes of the mountain were cloaked with a lush tropical forest, except for small patches where enterprising Indians had cleared the jungle with their stone axes so they could grow corn, beans, and pumpkins. In the valleys around the base of the mountain were much larger clearings. Clusters of oval huts with steep, conical palm thatched roofs marked the villages of the natives.

From the summit of the cone on a clear day an Indian could look to the south and see the blue Pacific. Turning to the north, he could see the waters of the Caribbean.

In this well-watered region the rich volcanic soil supported a dense and prosperous population. The climate of these valleys, from 3,000 to 6,000 feet high, was cool and pleasant.

Earthquakes Ruin Prosperous People

The Indians of this salubrious region were a tall and handsome people. Normally they used little clothing. On special occasions or when traveling, the women wore fringed skirts of woven cotton which reached from the waist to the knees; men donned ankle-length robes of fringed cotton. They painted their faces and bodies in bright red, blue, and white designs.

The more prosperous wore beautiful ornaments of gold in the form of birds, frogs, and monkeys, or large disks hung on the breast.

For several centuries the Indians had tilled their fields. The women made beautiful pottery vessels, some of the most shapely in all the New World (pages 238 and 239).

Then, one day, came calamity—a savage earthquake shook the entire region. It was followed quickly by others even more violent.

Eventually came a convulsion greater than all the rest. The side of the crater was breached and the waters of the lake rushed out in a great avalanche of mud and enormous stones. Tearing down the mountainside, the flood destroyed or buried everything in its path.

The Indians died a desolate wave of sterile ash and naked tree trunks. They never returned.

By the time Nature had restored the forest and the rains had leached out the ash layer to a thin deposit that would permit cultivation of the soil again, a much greater catastrophe came. The Spaniards had arrived and begun the conquest of the people who so obviously were rich in gold.

Goal of Latest Panama Expedition

Such is the story we found written in the geological and archeological records of the Chiriqui highlands where the National Geographic Society-Smithsonian Institution expedition to Panama conducted most of its field work during the winter and spring of 1949.*

The preceding winter we had spent four months digging in the Azuero Peninsula, on the Pacific coast of Panama. This year we had planned to focus our investigations on the prehistory of Panama, in the Province of Veraguas and in the highlands of Chiriqui (map, page 229).

Especially were we interested in a Chiriqui locality called Barriles, where Dr. Alejandro Mendez had secured for the National Museum of Panama a number of amazing life-size statues of unusual artistic merit and strange design.

His other discoveries were several remarkable four-legged *metates*, or corn grinding stones, beautifully carved and decorated and of enormous size. Of equal interest were large urns with boldly incised designs, painted red or orange, representing curiously stylized birds

* The 1949 National Geographic Society-Smithsonian Institution Expedition to Panama is the latest in a comprehensive study of pre-Columbian cultures in Middle America. For accounts of previous expeditions, see the following National Geographic Magazine articles by Dr. Stirling: "Exploring the Past in Panama," March, 1949; "On the Trail of La Venta Man," February, 1947; "La Venta's Green Stone Treasure," December, [illegible]; "Finding Jewels of Jade in a Mexican Swamp" (La Venta), November, 1942; [illegible] Jade" (Cerro de las Mesas, Mexico), September, 1941; "Giant Stone Faces of the Mexican Jungle," September, 1940; "Discovering the New World's Oldest Dated Work of Man," August, 1939.

There's More to This Hole in the Ground than Meets the Eye!

[illegible] Province. [illegible] was added to Caribbean Air Command headquarters at Albrook Air Force Base, Canal Zone.

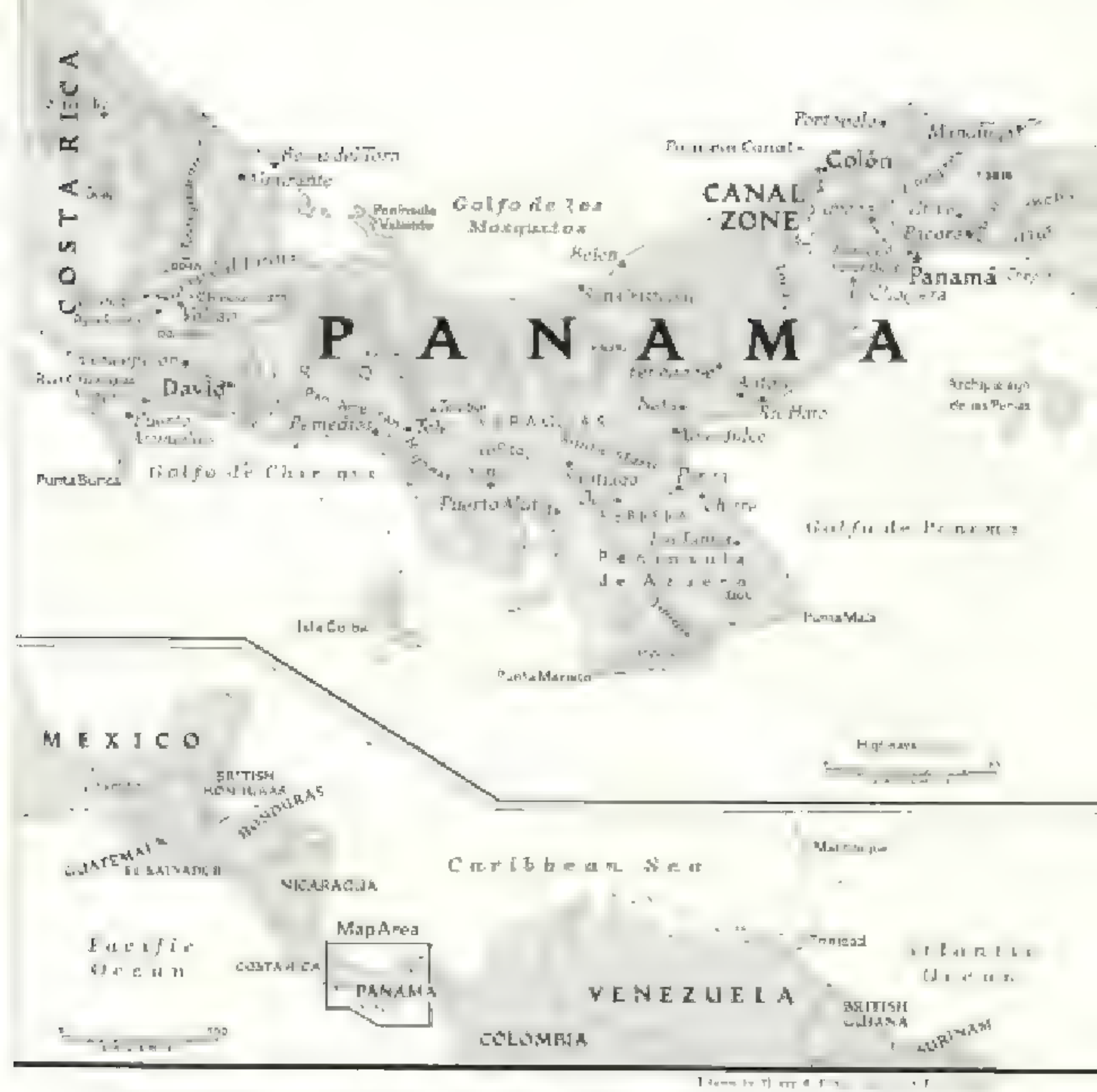
[illegible] animals. Since this pottery differed so much from that of the surrounding Chiriqui culture I felt reasonably sure that at Barriles there must have been a local civilization quite distinct from any Middle American culture yet found.

When I arrived in Panama the first week in January, I was accompanied by my wife, Marion, and Richard H. Stewart, staff photographer of the National Geographic Society. Much assistance was given by Maj. Gen. Willis H. Hale, then commanding general of the Caribbean Air Command, headquarters at Albrook Air Force Base, the Canal Zone.

General Hale gave us valuable cooperation. Among other things he lent us a weapons carrier. With this and a three-quarter-ton truck we were able to reach otherwise inaccessible spots.

Information Comes via Guam

Just before leaving for Panama I received a letter from Dr. Philip Drucker, who had accompanied me on several expeditions to Middle America. He was writing from the South Pacific, where he was temporarily serving with the Navy. In Guam he met a fellow officer who, while on jungle maneuvers in Panama, had seen some mounds in a patch of savanna in the deep jungle bordering the



By Helicopter, Truck, and Dugout Canoe, Archaeologists Cover a Broad Sweep of Panama's Buried Past

[illegible] of Chiriquí volcano, near the Costa Rican border. East of the Canal Zone, at the mouth of Río Tigre, [illegible] village sites were surveyed from Air Force helicopters. At Cerro the party encountered a yellow [illegible] Tombs at La Pita in Veraguas Province, yielded pottery, stone, and metal relics. Expedition headquarters were at Albrook Air Force Base.

[illegible] Tennis at Albrook, when he suggested, "Why [illegible] Tennis [illegible] Hill will [illegible] for you."

[illegible] Sikorsky helicopters of the First Rescue Squadron were waiting for us (page 242).

[illegible] manner we finally came to the mouth of the Chepo and then followed up this large stream.

A Fallen Tree Serves as Footpath for Exploring Workmen Tramping Through Western Panama's Voluptuous Woodland

Note the cut in foreground. Photograph by Stanton, credit unknown. [illegible] Central American [illegible] Stanton [illegible] 200 [illegible] [illegible]

Picks and Shovels Bite into Peruvian Earth to Uncover Relics of Indians Who Vanished Five Centuries Ago

[illegible]

The region near the mouth of the river is all mangrove swamp, but after a few miles we saw considerable areas of savanna grown with tall grass. From them projected a number of small conical hills. I was certain that these must be the "mounds" of which I had heard and that they were of natural formation, in spite of their curious appearance and the [illegible]

I signaled to our pilot, Lt. Wilson T. Bonner, to land. Descending vertically to the level of the top of the vegetation, he beat down the grass with a blast of air from the rotors so that the ground beneath was visible. Then, settling cautiously to make sure that there was not soft sand under us, he set the ship down gently. The rotors stopped and we stepped out into grass almost as tall as ourselves (page 242).

In a minute Lt. John R. Peacock, with Dick and Marion in the other machine, landed a hundred feet to one side of us. We were directly at the base of one of the round hillocks. We climbed the mound and verified our surmise as to its natural origin.

Broken Pottery on Ground

However, on the surface we found a number of pieces of broken pottery, showing that these elevations had been utilized by the ancient Indians, probably as places of refuge during the rainy season when most of the flat ground was flooded.

We flew a few more miles up the river where the land was higher to examine some modern clearings with palm-thatched huts. Dropping low, to the consternation of the Indians living there, we could see the wooden mortars and household goods in the yard. Chickens and pigs fled madly in all directions.

Not wanting to frighten the villagers, we turned back downstream to the mouth of the river and flew south over the sea to Chepalo Island, three miles beyond the river's mouth. On this little island is a picturesque fishing village which we examined at close range, then circled low around the rim of the island, looking for shell mounds.

Flying slowly back to the mainland or hovering at low altitude over thick jungle, one can easily see through the trees. Any structure or feature on the ground below is plainly visible. Flying in a plane over the same jungle, the ground is completely hidden from sight.

I thought what a wonderful aid to archeologists the helicopter would be in searching for jungle-covered ruins in such regions as the forests of Guatemala and southern Mexico.

Occasionally we halted in mid-air while Richard Stewart made still and motion pictures. He would indicate to the pilot the angle from which he wished to shoot. The moviline would be held stationary in that spot while he briskly worked his cameras.

After about five hours, we returned to Albrook. To have made the same trip by canoe and on foot would have taken us more than a week.

After our return from Panama, we learned to our great sorrow that Captain Tennis had been lost with several companions in a flight over the Caribbean off Costa Rica.

Yellow Fever Outbreaks Reported

Before starting our work in Chiriqui, I had planned a small exploration trip in the region of the upper Tabira River, about 20 miles northeast of Panamá City. A mahogany cutter had told us of having noticed archeological remains there several years before. Since nothing whatever was known of the archeology of this part of Panama, we decided to investigate at once.

Two days before we were due to start, the Panama papers came out with headlines, "Yellow Fever Epidemic Breaks Out on Upper Pacora." Several sicken natives had been brought to Panamá and had died. Their ailment was discovered to be yellow fever, the first cases reported in Panama in many years.

Since tales of the terrible epidemics of the early Canal-building days were still remembered by the old-timers, there was considerable excitement. All of us had been vaccinated before leaving Washington, so we decided not to alter our plans.

Dr. Herbert Clark, of the Gorgas Memorial Laboratory, told us we need not worry, as the jungle type of yellow fever is transmitted by forest mosquitoes that live in the treetops and are more abundant in the wet season. As the wet season had ended a month ago, there was little danger.

Rounding up our guide, the mahogany cutter, we had him vaccinated. The next [illegible] we set out in our weapons carrier for Utive, a village in a patch of savanna at the foot of the jungle-clad mountains.

Our guide located two friends, and we set out on foot for the archeological site. On one hand the dense forest rose steeply to the high mountain ridge. The land on the other side consisted of two broad, flat natural terraces on which were numerous stone piles.

We drove our weapons carrier down the steep declivity and set up camp.

We were awakened in the morning by the guttural roaring of a troop of howler monkeys on the mountain slope above us. Soon our

Batons, Made of Ivorylike Manatee Bones, Bear Fanciful Alligator Designs

[illegible]

[illegible] from the village the night [illegible] appeared [illegible] through the ancient village site.

The next [illegible] while the workmen were building [illegible] approaching [illegible] Dr. [illegible] and Dr. Harold Trapido, from the Gorgas Memorial Laboratory in Panamá, and Dr. Pedro Galindo, of the Panamanian Government's Department of Health, [illegible] in quest of information on the yellow fever outbreak.*

They were pleased to learn that the natives who had had yellow fever had come from [illegible].

Mosquito Hunters Go to Work

Col. Norman W. Elton, of the Gorgas Hospital, joined the group (page 255). A [illegible] were set up [illegible]. Strings of [illegible] were installed [illegible].

Scientists were busy [illegible] trees and gathering the [illegible] plants [illegible] that hold water [illegible] section of one of these plants [illegible] the [illegible].

Yellow fever occurs in two forms. The [illegible] epidemic [illegible] of the type known as urban yellow fever.

In the New World the mosquito known as *Aedes aegypti* became [illegible] associated with the disease. [illegible] in this manner [illegible] epidemics. The [illegible] *Aedes aegypti* is relatively easy to control, and this method [illegible].

Jungle yellow fever is [illegible] known as *Haemagogus*, which [illegible].

Haemagogus, [illegible]. However, unlike the [illegible] mosquito, *Haemagogus* [illegible]. Sometimes when [illegible] they may be [illegible] and [illegible].

---

* See in The National Geographic Magazine [illegible] "[illegible] Story of the Mosquito" [illegible]

The danger is that these infected persons may then be bitten by the low flying *aegypti* and thus start a real epidemic unless control measures are put into effect quickly.

Dr. Galindo hired three men to sit up in tree tops to catch mosquitoes. When they came down, he put chloroform on their pantlegs and caught the dazed mosquitoes in tubes. When he caught his first *Haemagogus*, he was jubilant, and treasured it in a little box, as if it were an emerald.

The yellow fever cases at Chiré were undoubtedly of the jungle variety.

Our scientists seized the opportunity to conduct further research at a known focus of infection, and to prevent the start of an epidemic. To this latter end, all the inhabitants of Chiré were vaccinated and all the houses thoroughly sprayed with DDT.

The natives, dubious at first, were happy when they discovered that the chemical not only eliminated the mosquitoes but also killed the rest of the abundant insect pests in their houses.

In spite of these diversions, archeological work continued without interruption. We found stone axes, knives, whistles, grinding stones, spindle whorls used in making thread, and pottery in abundance (page 235).

Vessels of many forms and sizes were represented, and all were of types new to us. Painted pieces were very scarce, although a few were decorated with simple red and black geometric designs.

The principal decorations were stylized life forms modeled in low relief on the bodies of the vessels. These were skillfully executed and elaborate in design. Recognizable were birds, turtles, frogs, monkeys, and alligators.

Our two weeks at Chiré were packed with action. We came to know and like its people. We danced on the earthen floors of their palm-thatched houses at night, to rhythms produced by native musicians.

Back at Almirante once more, we made preparations for our main task—excavation of the site at Barriles in Chiriquí.

Our weapons carrier loaded with canned goods and supplies, we set forth on the familiar road to the west. During the war, when Army engineers worked on the western extension of the Pan American Highway in the mountains near the Costa Rican border, they built a comfortable headquarters building near the little native settlement called Nuevo California. Later, this was taken over by the Boy Scouts of the Canal Zone for use as a vacation camp.

Since it was not in use, we rented it for our field headquarters.

The camp, the most luxurious of all our expeditions, boasted a large living room with a huge stone fireplace, four bedrooms, a kitchen, and a storage room.

Charlie Williams, a tall, lean Trinidad Negro, came with the camp as cook.

Charlie cooked on a wood stove in a small outbuilding. This stove also heated water for a shower, which was in a stall alongside. He made very good biscuits using an inverted dishpan to hold the heat like an oven.

Nights were cool at our Nuevo California camp, 4,000 feet high. Strong winds blow steadily during February and March, across the open plains near the base of Chiriquí volcano.

A number of retired Americans, attracted by fine climate and beautiful scenery, have built homes in the Chiriquí Viejo Valley.*

Glenn Lewis and his wife, Mae, who have a beautiful home on the bank of the river, kept our table supplied with fresh rainbow trout, fresh vegetables, and fruit from their garden. Lewis gave generously of his time in guiding us to archeological sites.

Mr. Senn, the postmaster, was born in Switzerland and spent many years in Java before coming to Panama. One of the first settlers in the Volcán region, he knew more about it and its inhabitants than anyone else.

The Barriles "dig" lay only four miles south of camp, but 1,000 feet lower. It required more than half an hour in our weapons carrier to cover this distance over a rough and dusty logging road.

Sometimes, when the wind blew extra strong at night, we found the road blocked with fallen trees.

When the trunks were too large, we built detours around them. One forest giant fell in such a strategic location that the necessary detour added ten minutes to our trip each way for the remainder of the season.

Strange Carvings on Rock

The archeological site is located on a fairly level elevation by the side of a clear little stream. The ceremonial center consists of a raised area about 50 yards long and 30 yards wide. At the east end of this rise is a large natural rock covered with carved petroglyphs in the form of spirals and irregular radiating lines terminating in cup-shaped depressions.

Local legend had it that this was an aboriginal map. The lines were trails leading to the depressions which represented tombs rich in gold. No gold has been found at

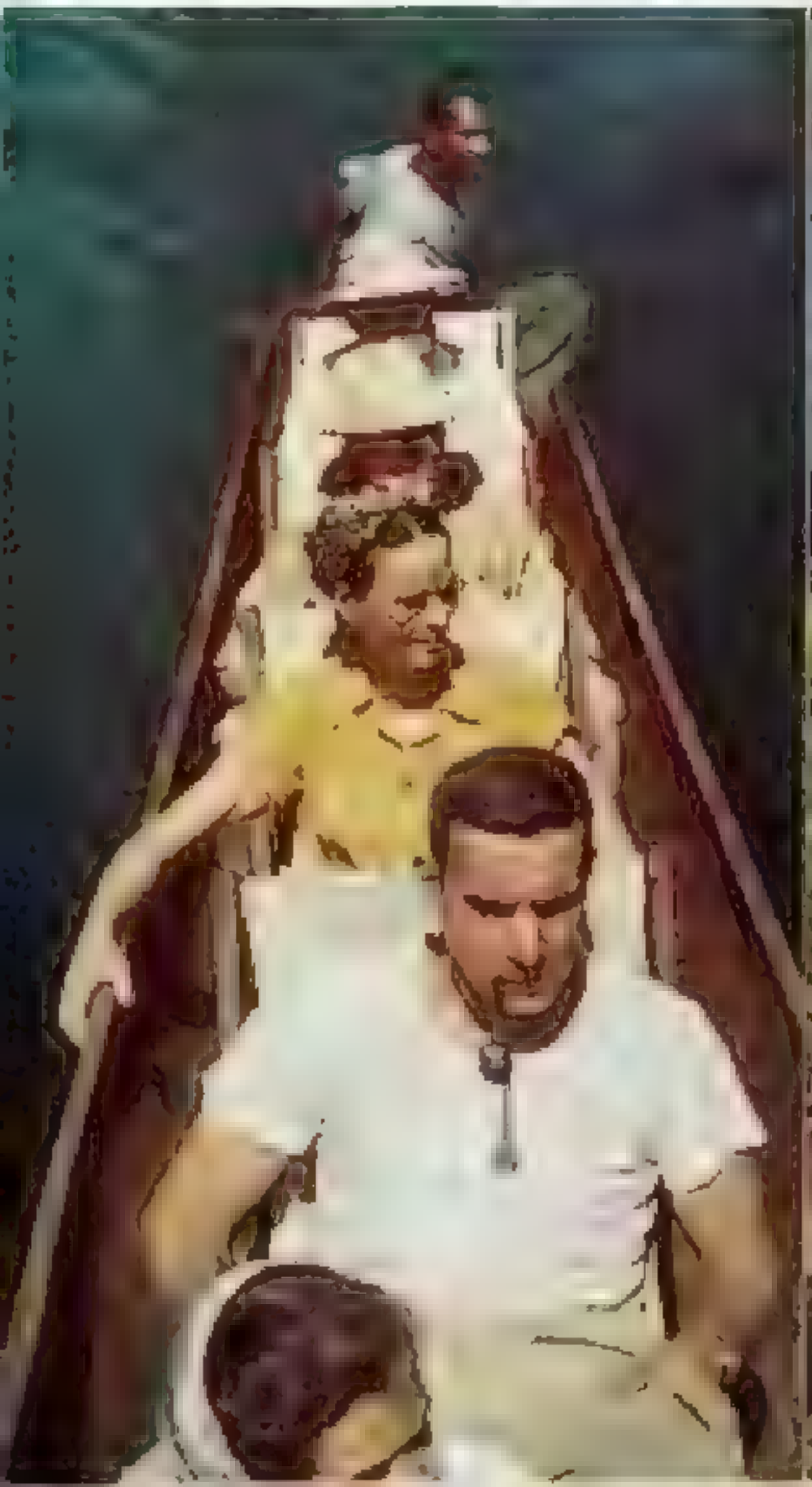
* See "Panama, Bridge of the World," by Luis Marden, NATIONAL GEOGRAPHIC MAGAZINE, November, 1941.

Panorama: Ship Parts Together Jigsaw-puzzle Fragments, Looks with Panama's Colorful Past

Above: Panama's Swift, Crystal-clear Chiriqui Viejo River Arena[illegible] Gives Way to Angling

[illegible]

In an Outboard-powered Dugout, Friends Take the Starlings for a Cruise on the Winding Chagres River



Indian Relays Dog from Panama Sent Tell of Life in America Before the Spaniards Came

[illegible]

A Deep Tomb in Veracruz Province Yields Carved Stones, Decorated Bowls, and Ornaments of Gold and Carnelian

By [illegible] [illegible] Museo Regional [illegible] Veracruz [illegible] Left: [illegible] Right: [illegible]

Capital Has Decided to 1288 Suggests the Lowest from Paris; an Insect-trapping Plant Opens Wide for Lovers Pres

Archeology Takes Wings: Helicopters Cut Our Weeks of Foot Travel

[illegible]

For Nimble Gliders, a Swamp Serves as Well as Hard Ground

[illegible]

Barriles, although the individuals represented in the stone statues appear to be wearing gold ornaments.

At the west end of the central rise the stone statues mounted on pedestals had been erected in a transverse line. When discovered, all had been thrown down and broken, apparently by a later group of Indians (page 237).

Our excavations revealed four primary soil formations. The first is a surface layer, about six inches thick, of a dark-gray sandy humus. Under this is a compact layer of volcanic ash and pumice, also about six inches thick (page 231). This ash lays over a 3-foot layer of rich black soil which marked the occupation period of the site. Beneath this, the base formation is a compact yellow clay.

Broken fragments of pottery were scattered all through the black soil. This seems to indicate that the site was occupied for a long time, since only six inches of soil have accumulated since the eruption of the volcano.

In the ceremonial center our excavations revealed several rectangular floors or foundations of massive stone slabs and boulders, and a number of caches of pottery vessels.

The pottery at Barriles was well made and often elaborate. Most of the ware was unpainted or painted with a single color, red or black incised designs being common.

The only two-color ware was a rare combination of red and bright lemon yellow. Many of the vessels were mounted on tripod legs in the form of bird, animal, or human figures. Rims of vessels were often decorated with protesque applique animal forms, and less frequently the bodies of large urns were ornamented with frog figures in high relief.

Interiors of many bowls were painted by the so-called "lost color" technique. Designs were laid on in wax, and red or black paint then applied. When the wax was removed a negative painted design remained.

In size, vessels ranged from miniatures no more than two inches in height to three-foot urns. A number of large urns were excavated in the vicinity of the ceremonial center. All were covered with lids consisting of inverted bowls. One such covered urn, of exceptionally hard, thin ware painted red, was excavated at a depth of five feet.

The entire site covered an area about 400 yards square. Tombs were found scattered throughout this area. They consisted of shafts sunk into the yellow clay base in which were hollowed out circular chambers six or seven feet in diameter. These were easy to excavate, since they were filled with the soft black soil of the site, which contrasted sharply with the hard, yellow clay.

One elaborate tomb consisted of three slab-lined chambers connected by tunnels and having but a single entrance shaft. There was nothing whatever in it.

At Barriles there were seldom any pottery vessels in the tombs. The usual offerings consisted of corn-grinding stones with three or four legs. Some of them were very large and elaborately carved and decorated.

About the time Barriles was occupied, there apparently existed a religious cult which extended from Veraguas in Panama through Costa Rica and into Honduras. The cult's colossal grinding stones must have been features of a special ritual.

We worked for two months at Barriles, and then began excavations in some of the cemeteries left by the Chiriqui Indians, who were the region's last pre-Columbian inhabitants.

Indian Cemeteries Excavated

Ever since the time of the Spaniards, these tombs have been looted, since many of them contained gold and the pottery is some of the most pleasing found in the New World.

The cemeteries are almost always located on the summits of high ridges or on the rims of steep declivities that fall away to a running stream.

Tombs vary from 5 to 15 feet in depth. They are circular chambers hollowed out at the base of a cylindrical shaft and lined and covered with flat limestone slabs. The limestone covers make it easy for the native gold-seekers to locate the tombs. Over one previously looted tomb that we excavated at Palo Santo, a large farm near Nuevo California, we removed a cover consisting of about two tons of limestone slabs.

There was one excursion we wished to make before returning to Panama. Luis Hartman, the "Daniel Boone" of Panama, had described archeological remains, similar to those at Barriles, located in the rough mountains near the Costa Rican border.

On this trip we were joined by our friend Ben Grauer, of the National Broadcasting Company, who in previous years had visited our camps in Mexico.

Sending horses ahead, we took a Jeep as far west as it is now possible to go in that direction on the Pan American Highway. The road soon began climbing steeply toward the pass called La Silla, "The Saddle."

A few miles beyond Nuevo California we noticed that some wag had planted a sign reading "City Limits of Los Angeles."

At the Saddle, where the descent began, our horses were waiting with two of our workmen whom we had selected as guides.

In an Indian Chieftain's Last Resting Place, Workmen Uncover a Huge Metate

This [illegible] [illegible] [illegible] [illegible] from [illegible] the [illegible] Indian [illegible] [illegible] and [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible].

The region beyond the [illegible] is wild and [illegible]. The [illegible] between the [illegible] and the border [illegible] of Swiss [illegible] small colony, where they now raise cattle and [illegible] [illegible].

At the end of a long day's ride through [illegible] mountain country we found lodging at the home of one of the Swiss, Werner [illegible], who, with his Panamanian wife and [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] the [illegible] colony.

The next day we set out for the mountain home of the fabulous Luis Hartmann, who as a young man had come to Panama from [illegible] via New York, Philadelphia, and South America. Enchanted by the wild country, he became a huntsman, farmer and prospector.

Whenever someone built a house within a day's [illegible] travel of his location, he would pack his belongings and move to a less secluded forest spot to build a new home.

With his last wife he raised a family of 11 children, all of whom he [illegible] [illegible]. [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible].

In Panama whenever we asked for information on the wild region of Chiriquí, our informants would tell us [illegible] [illegible] of their country, and then invariably would end by saying, "But to be sure, you had better ask Luis Hartmann."

As a young man, Hartmann spent [illegible] months searching for the legendary [illegible] [illegible]. He later panned for gold in various streams of the Republic.

With an intense [illegible] for all phases of natural history, he was deeply interested in [illegible] archeological sites and [illegible] [illegible] [illegible]. Although he was without professional training, I was amazed at the [illegible] of his [illegible].

As we approached the [illegible] of Hart-

Brown Faces Record a Solemn Event: Inoculation Against Yellow Fever

[illegible] Zone. [illegible]

[illegible] we encountered a pre-[illegible] with the [illegible] of a large [illegible] He [illegible] was one of [illegible] the house.

We found [illegible] at home. [illegible] heard [illegible] possessed of [illegible]

[illegible] an interesting archeological [illegible] in the country and [illegible] a large collection of pottery [illegible]

[illegible] we [illegible] of the interesting Veraguas [illegible] Don Marcos [illegible] This [illegible] Veraguas archeology.

Excavating these deep tombs with their [illegible] required skill. It was also [illegible] work. Here we [illegible]

Some Tombs 30 Feet Deep

Locating the tomb entrances [illegible] In some [illegible] with stones [illegible] where [illegible] More [illegible] there is no [illegible] other than a [illegible] in the [illegible] of the [illegible] material [illegible]

The deepest tombs [illegible] were [illegible] in Veraguas [illegible] 30 feet deep. Sometimes [illegible] at the [illegible] of the chamber [illegible]

A Large Bolivar Shoulder, Woven Basket and Yankee Machete

[illegible] on his way to the field to gather vegetables. [illegible] the archeologists at work. His horn-handled knife [illegible] ville, Connecticut. Its use varies from killing snakes to felling [illegible]

[illegible] about 14 inches from the bottom of the chamber, the shovel is set aside and work is continued with a machete. As offerings are encountered, the earth is cleared from around them [illegible] tion can be determined.

We excavated more than 20 tombs at La Pita, and as a result were able to obtain a fine [illegible] of tombs in this for the area and also a splendid collection of pottery, stone, and metal artifacts representative of the [illegible]

Our best find was Tomb 15, which contained more than 50 pottery vessels, some of exceptional beauty. There were also 70 polished stone axes, and a necklace of polished carnelian beads attached to a large [illegible] of the same material. There were six pottery whistles, and in perfect working condition, made in the form of birds and animals, and 26 flat arrowheads.

There were two four-legged [illegible] stones, one particularly fine with carved decorations and exceptionally long legs in the form of crocodiles. There was a disintegrated ornament in the form of a king vulture made [illegible] metal plated with gold; a number of hollow gold beads, a nose ornament, and a fine human figure of solid gold.

No trace of human bones remained in the tombs, but [illegible] of them tapir teeth and skulls had been placed in the shaft [illegible] These were fairly well preserved. Tombs such as No. 15 give us more than a hint of the rich culture that once flourished here.

[illegible] Jaguar [illegible] very interesting archeological sites in the Santiago area and presented us with some [illegible]

Here he had found an ancient cemetery with tombs containing intricately carved corn grinding stones, art ware pottery vessels. This cemetery is located in a [illegible] petrified trunks of trees. Instead of the usual basalt columns, these people had used petrified logs as their [illegible]

Tired, but well satisfied with our results, we returned to Panamá with our weapons [illegible] boxed with our collections. Here we spent [illegible] National Museum studying its fine collections and conferring with the director, Dr. Alejandro Méndez, whose assistance had done so much to make our work successful and pleasant.

Strange Courtship of Birds of Paradise

By Dillon Ripley

Associate Curator of Zoology, Peabody Museum of Natural History, Yale University

I [illegible] jungle of New Guinea. I sat in my small shelter of branches and waited. Everything was still and quiet.

Suddenly, with quick, darting flight, a coal-black bird flew into a tree directly over a patch of cleared ground roughly 5 feet in diameter and 30 feet away from me. It was a male six-plumed bird of paradise and this was his courtship dancing floor. Even at that distance I had a flash of his china-blue eye and the patch of silvery feathers over his bill (pages 257 and 273).

The bird sat quietly for a time, and then called—a sudden harsh croaking sound. He called several times, becoming more and more agitated.

Finally, looking tensed, with tail and wings held rigidly outstretched, he left his perch and started down in a series of short flights from branch to branch. He seemed to move with trained precision, as if his course was charted by long usage. The last few branches were very close, and on these he hopped, stally and with little sidewise flirts of the tail.

Once on the ground, he darted from side to side so fast that the eye could barely follow. In a moment it was over, and the bird flew straight off with one last croak.

I did not see the object of his affections, but one of my collecting boys reported seeing a bird dance while a female coolly watched from a tree overhead.

Evidently these dancing places are used for a long time. The horizontal branches on which the male bird alighted on his prescribed course down to the ground were deeply scored with the marks of claws.

Trapping Takes Days of Patience

As an ornithologist, I had come to study various species of the birds of paradise, whose courtship displays are the most curious and striking in all the world of birds. My camp was on top of Bon Kourangen, which appropriately means "Paradise Bird Mountain," in the Tamrau Mountains of northwestern Netherlands New Guinea.

Seeking a closer acquaintance with the six-plumed member of this fabulous family, I suggested to my Papuan boys that they try to trap it. I offered them five guilders a bird, equal then to about two and a half dollars, a phenomenal price to them.

At first there was a hushed silence, and then a shout of approval. At least 10 men looked about knowingly, smiled and nodded, then darted off to pack up their belongings. In 15 minutes they had all but the trail, some of them with their wives.

A half hour later, to my distress, seven were back again, smiling a bit vaguely.

"What on earth is the matter?" I asked. "What are you coming back for?"

"Oh, Tuan," one of my gun boys said, "these ones don't really know how to trap the birds. They only thought so when they heard you make that big talk. And then they were excited about the money."

Two days later, however, two of the men returned with six-plumed *kouranges*, and an all-but-unbelievable story. They told me they caught the birds by waiting a couple of days [illegible] nuts were draped over a branch where the birds were in the habit of perching. Then the man waited. If his wife was with him, she would steal up at intervals to give him food.

In all, five of these birds were trapped during my stay on the mountain, and, much later, one reached the United States alive.

I saw the spectacular sickle-bill, or long-tailed bird of paradise, only twice (pages 259 and 274). One was a male sitting high up on the bare branch of a huge dammar, or gum tree. Evidently there was a female near, as he was displaying. The butterfly feathers stood out on each side. The tail was partially spread.

Suddenly he gave his call, a loud penetrating whistle sounding like the syllable "whick." It was a note I had heard often ringing over the steep valleys in the mountains. Then he turned and made a nose dive straight for the ground, a hundred feet below. At the last instant he flicked with wings and tail and dropped back to the branch again, all in one graceful motion.

The birds of paradise belong to a single region of the world, the Papuan, comprising New Guinea and neighboring islands (map, page 266). Their nearest relatives are the [illegible]

[illegible] the plainest of the paradise birds look a lot like small glossy crows. These are the manucodes, a group of five species of blackish birds clothed in shiny iridescent feathers of simple shape. However, that is [illegible] birds branch off in a variety of unique forms.

[illegible]

Paradise Plumes of the Nepalese Court Are Treasured Like Crown Jewels

[illegible] World War II [illegible] New Guinea [illegible]

The latest classification places the number of species of paradise birds at 41. These share membership in a closely related family of bowerbirds, with perhaps some 18 species.

In spite of its size and accessibility, New Guinea has been "only well explored," and it is doubtful that there are many more new or [illegible] birds of paradise.

As recently as 1935, an Australian patrol [illegible] Mount Chamberlain at an altitude of 8,200 feet in the central [illegible] New Guinea, one pair of paradise birds [illegible] from around his camp. [illegible] two feet long, which made them [illegible] the birds [illegible]

Tail Feathers in Native Headdresses

Those [illegible] for the London Zoo [illegible] feathers of [illegible] headdresses [illegible]

With Paradise Bird Plumes in His Hair, a New Guinea Swain Comes to a Dance

[illegible] Netherlands New Guinea. [illegible]

[illegible] scientific descriptions of this [illegible] paradise were published. But, unfortunately for these [illegible], it was later determined that the mysterious [illegible] had been [illegible] by a German [illegible] in [illegible] Indies [illegible] but the bird had been described and named. It was the white-tailed, or silk-tailed, bird of paradise, one of the most remarkable species (pages 266 and 273).

[illegible] that when the first [illegible] reached Europe, though there [illegible] in 1522. The [illegible] strange plumes [illegible] and lesser bird of paradise were [illegible] in the East Indies for centuries before the Portuguese [illegible] in the [illegible] century.

[illegible] the Junizaries of the Turkish court, Pierre Belon, an early French naturalist who traveled in the Middle East before 1550, noticed plumes which he [illegible] came from the mysterious plateau, the [illegible] paradis paradise plumes. In 1548 John van Linschoten, writing of birds which had arrived in

Holland from China, called them "avis paradisi."

Traders reported the birds lived in the air, always turning toward the sun, and never alighting on the earth till they came to me. They also said that the female laid her eggs in a hole in the male's back, and that the birds drank dew as it "fell."

The birds were supposed to have no feet, but an English scientist, John Latham, writing in 1782, exposed this pleasant nonsense by describing the method the Papuans used to preserve the skins of the birds they captured and sold. It was this mutilation of the skin which gave rise to the legend.

"The whole trouble they were at on this occasion," he wrote, "was merely to skin the bird, and, after pulling off the legs, coarser parts of the wings, etc., thrust a stick down the throat into the body, letting an inch or two hang out of the mouth, beyond the bill; the whole packed in a bamboo casing to protect the plumes.

"On the birds drying, the skin collapsed about the stick which became fixed and supported the rest. They had then no more to do than to fit this into a socket in the turban [illegible]."

Latham described how the grandees of India, China, and Persia ornamented themselves and [illegible] their horses with these plumes, and [illegible]. The Dutch got them chiefly from Ti[illegible] to which place the natives of Aroa [the old spelling for the Aru Islands, south of New Guinea] bring them by way of traffic."

By the time the British naturalist Alfred Russel Wallace arrived in New Guinea and nearby islands in the 1850's, the trade in plumes of birds of paradise had reached considerable proportions.

In his fascinating book, *The Malay Archipelago*, Wallace described how the natives of the Aru Islands built shelters high up in the forest trees near the communal dancing grounds of the greater bird of paradise and then shot the birds with a bow and arrow, "the arrow having a conical wooden cap fitted to the end as large as a teacup, so as to kill the bird by the violence of the blow without making any wound or shedding any blood."

Occasional birds were caught alive by means of gutta-percha or birdlime, or by snares of various types. The first to be taken to Europe alive were probably the two males of the lesser bird of paradise which Wallace took home to England in 1862.

The paradise bird plume trade reached its peak in the eighties and nineties of the last century. Nearly 50,000 plumes a year were exported, principally to Paris for capes, hats and other extravagant accessories of the feminine fashions of the time.

Every year, just after the birds had molted and assumed their new bright plumage, swarms of Papuan and Malay hunters would venture into the deepest forests and most inaccessible interior of New Guinea. Along the shores, at such places as Hollandia, Manokwari, and Sansapor, temporary boom settlements would open up, thronged with Chinese, Arab, and Malay traders. The rivalry was great, prices fluctuated considerably, and it could be a dangerous game.

By the 1920's the paradise trade was forbidden. Nowadays many of the species which were becoming rare have made a good comeback.

It is still possible to buy paradise bird plumes in Paris, but these are old skins, bought before the ban was imposed. A friend of mine found old trade skins of 21 different species of paradise birds in feather dealers' shops on a trip to Paris before the war. Let us hope that the fashion of wearing these plumes will never be revived.

Swamp Bird Wears 12 "Wires"

It is characteristic of the paradise birds that each species has a rather definite range, whether it be the mangrove swamp forest at the edge of the sea or the high, cold mountain forest above 11,000 feet.

The mangrove and sago swamps are the home of the twelve-wired bird of paradise, a lovely thing a little bigger than a starling (pages 256 and 272).

Four or more species of paradise birds are commonly found in the lowland jungles. Among these are species of the plume birds of the old days.

The commonest are the greater and the lesser birds of paradise, only slightly different in size and shape (pages 252 and 253). Both are about the size of an overgrown bluejay, with yellow heads and mantles composed of short plushy feathers.

The display of these birds in flight is made startling by the soft plumes which rise from the flanks and cascade over the back and tail.

The birds make loud gonglike calls. To hear this ringing "gong ang-oog," and to see two or three males floating off through the green jungle, the sun catching and tinting their cascade of plumes, is a fantastic and arresting vision.

One of the rarest members of this group is the high-mountain Archduke Rudolph's blue bird of paradise, named after the tragic figure of Mayerling (page 251).

At Courtship Time New Guinea's Blue Bird of Paradise Dances Hanging from a Twig

Four Rival Males in the Greater Bird of Paradise (Elg Bonaparte) with Waving Plumes in Their Vain Attempt for a Female's Favor

Showy Decorations Vary in Color Among the Races and Species of "Plume Birds"

Crosserw-shaped "Wires" Leaf from the Tail of the Male Red Bird of Paradise, Found on Waigeo Island, Near New Guinea

Emperor of Germany's Bird of Paradise Shows His Display Right Side Up and Goes Into It Upside Down

Undiscovered Birds of Paradise Make Spectacular Love with Bright-colored Mouth and Feather Fan, but Get the Cold Shoulder

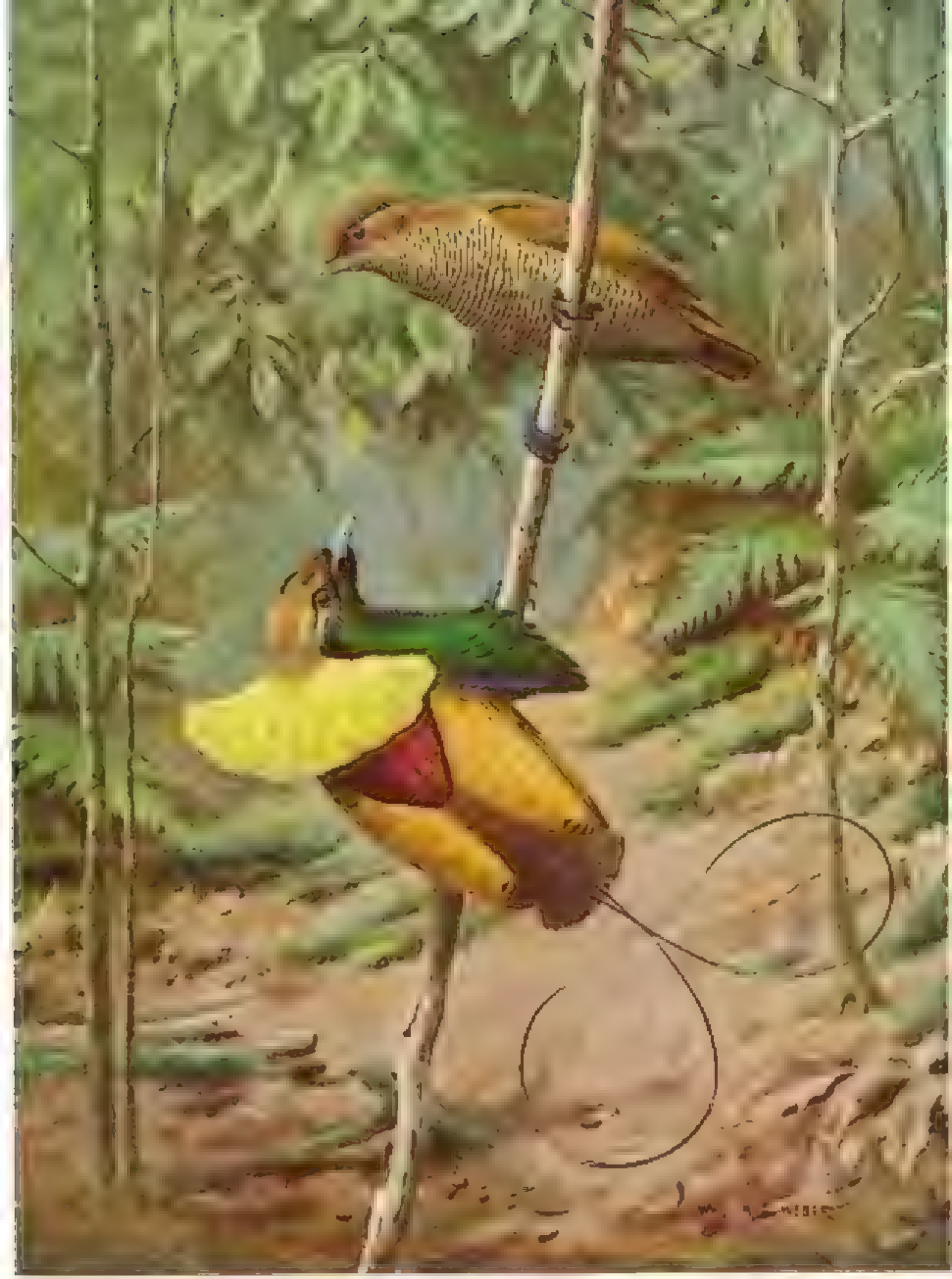
Sericulus: Birds of Paradise, or "Bowbirds." Have Accompanying Sets of Wire-like Feathers Springing from the Base of the Head

Two of the Tallest Birds of Paradise Have Some of the Oddest Adornments

[illegible] Wilson's [illegible]

[illegible]

The Lesser Nighthawk Folds His Wings, Raises Iridescent Shoulders and Black Cape



A Plum Superior, Be the Ballroom Floor—of the Male Magnificent

[illegible]

A Bird to Make You Rub Your Eyes—Wallace's Standard-wing

King of Saxony's Bird of Paradise Wears the World's Most Extraordinary Plumes

Arches Wings Are Extended Suddenly with a Dull Boo as the Magnificent Bird-bird Displays His Gorgeous Neckpiece

D'Albertis's Bird of Paradise, the Short-tailed Sickelbill, Seen on Arrival at Its Balcony. Page 289

Ribbon-tailed Birds of Paradise (male). Twin Feathers Two Feet Long.

I think the prettiest bird of the lowland jungle is the king bird of paradise, a little fellow smaller than our own robin and colored a rich ruby red (pages 248 and 274).

Once I saw a male displaying to a female who sat, supremely oblivious, preening her plumage. The male was maneuvering up and down a vine and the trunk of a near-by tree with as much dexterity as a nuthatch or a woodpecker. From time to time he moved in a series of stiff, awkward hops which apparently marked the height of his rendition.

At these moments he seemed to go rigid all over in a paroxysm of excitement. At the same time he made a snapping noise with his bill.

The sight was reminiscent of the climax of a turkey gobbler's display when he quivers and trembles and runs forward a step or two, dragging his wings on the ground and making a little hissing noise.

Little is known about the actual nesting habits of the bird of paradise family. Few nests have been found in the wild state, although in 1938 and 1939 Dr. A. L. Rand, then with the Archbold expedition (page 270), made some interesting observations on one of the species of manucodes and on the rather dull-colored MacGregor's bird of paradise.*

Gay Blades Disdain Domestic Life

In these duller-colored species, in which the male and female resemble each other closely, they seem to share the duties of incubation and care of the young.

This is in complete contrast to the brightly colored forms in which the male does an elaborate display. The female simply comes to the male's dancing ground to mate with him, and then goes off about her own business. The males of these species are really bachelor birds who don't care a fig about domestic life.

There are several records of paradise birds nesting or attempting to nest in captivity. The little red king bird of paradise nested in the zoo at Batavia, Java, but the young later died in the nest. In Soerabaja, Java, the lesser superb bird of paradise laid eggs in 1938, but—possibly being ignorant of these matters—the female simply laid the eggs while sitting on her perch, with the result that they all smashed to the ground.

My friend K. S. Dharmakumarsinhji, of Bhavnagar State, in India,† was able to raise [illegible] However, the bird later escaped from his aviary and my Indian friend has so far not been able to repeat his triumph. Another young male bird of this species has recently been reared in the zoo in Calcutta.

No doubt in future years more paradise birds will be kept in captivity, not only for their beauty—which surpasses that of almost any other group of birds—but also to give mankind a chance to study their quaint and little-known habits and their erotic displays.

The brilliant display of male birds of paradise to their ladyloves is part of a complicated ritual which serves to reveal sexual maturity and readiness to breed. It also has the function of stimulating the female and developing her responses so that the breeding cycle of both birds may be coordinated. Many species of these birds tend to meet at communal courtship grounds, as prairie chickens do in this country, or the blackcock in Europe.

Why did birds of paradise develop such elaborate ritual patterns? Some scientists believe that only by these complicated and highly specific displays have the various species been prevented from hybridizing among each other.

Even at present many wild birds of paradise have been collected which show traces of hybridization among different species and even genera. Thus it may be that if these strange creatures did not possess such elaborate displays, hybridization would be even more frequent among species that live in neighboring territories.

Blue, or Archduke Rudolph's, Bird of Paradise, Page 251

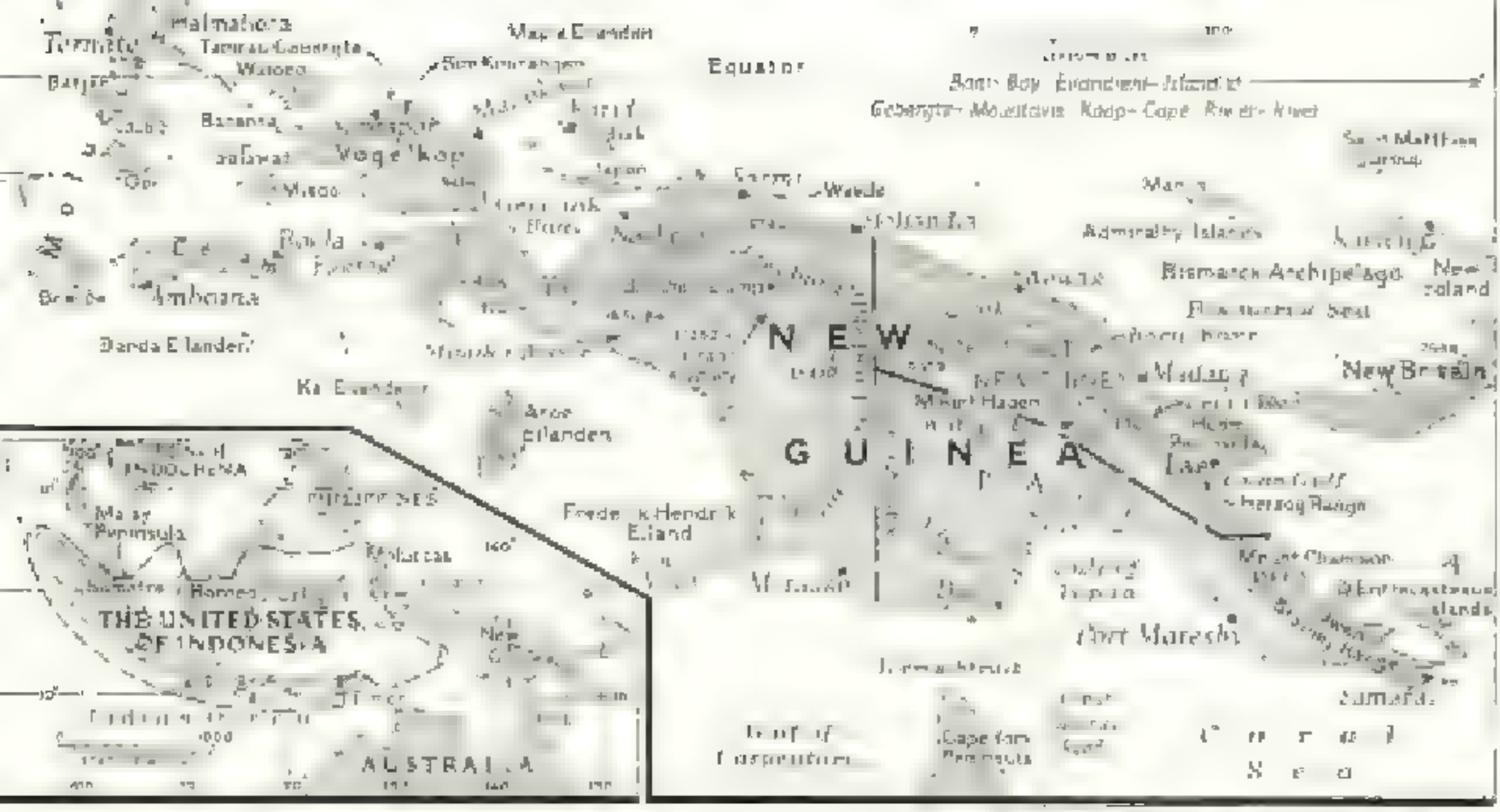
Of all the species of the genus *Paradisea*, the most striking is *rudolphi*, the blue bird of paradise. It is found in the Owen Stanley Range and the Herzog Range of eastern New Guinea at altitudes of 6,000 feet and more. Virtually nothing is known of its habits in the wild state, and the local Papuans display a strange reluctance to catch it, probably for some superstitious reason.

The first to be captured alive was taken in 1938. Since then a number of others have reached England and America. The display has been described to Dr. Lee S. Crandall, the General Curator of the Bronx Zoo in New York City. This species and *guilielmi* (page 255) are the only two which are known to hang suspended upside down in display. It may well be, however, that the almost unknown but closely related species, *decora*, of the D'Entrecasteaux Islands off eastern New Guinea, performs in the same way.

Rudolphi starts by sitting quietly on his perch

* See "Unknown New Guinea," by Richard Archbold, NATIONAL GEOGRAPHIC MAGAZINE, March, 1941.

† See "Life with an Indian Prince," by John and Frank Craighead, NATIONAL GEOGRAPHIC MAGAZINE, February, 1947.



Birds of Paradise Live in Wild New Guinea, No Heaven to Men of World War II

Only one place in the world—this [illegible] covered by the Equator—is home to these birds of strange and beautiful plumage and [illegible]. Here both the author and the artist have studied paradise birds in the wild. New [illegible] are found on some neighboring islands and Australia's Cape York Peninsula. Such [illegible], Wakde Island and the Admiralties served landings in the grim campaign against the Japanese. [illegible] shows the United States of Indonesia, set up by the Hague agreement of November 2, 1949.

and calling. Then, slowly and with care, he lowers himself backward. When he is hanging straight down, he shakes suddenly, throwing out his plumes on each side. As he gently rocks his body from side to side, he makes the plumes dance and flutter and occasionally he makes himself still harder to make the plumes stand out farther.

All the while the bird sings in a low monotone, but tired to one side to observe the effect of any of this bizarre courtship performance.

Among the *Paradisea* group of species there is a definite progression from the display of the greater bird of paradise (pages 252 and 253), which consists of its search and vibration of plumes above its back, to Count Salvadori's of paradise, in which the plumes are spread in a veritable frenzy while the bird moves rapidly about, finally to the forward and the bird is almost perpendicular.

The third stage would seem to be that of the Emperor of Germany's bird of paradise (page 255), which starts in an upright position but soon sends over until it is upside down. The final stage is the blue bird, which doesn't even start its display until it is hanging head down.

Greater Bird of Paradise, Pages 252 and 253

The first of the birds of paradise to become known to the Western World was the greater, named *Paradisea apoda* by the Swedish naturalist, Linnaeus, in 1758. Trade skins seen in Europe had been prepared without the legs, giving rise to the idea that the bird was "apodal" [illegible].

The typical greater bird of paradise is found in the Aru Islands south of New Guinea. Six additional subspecies, or geographical races, occur along the coasts of New Guinea, from the Mimika River, in the south, around to the eastward along the coast as far as Huon Gulf and up to the Ono, a tributary of the Kemu River on the north east. One of the races of this bird has been known to hybridize with a race of the lesser bird of paradise, a fact which shows the close relationship between the species.

Little has become known of these birds since the time of Alfred Russel Wallace. His description of the courting birds, first published in 1869, is as good today as it was then.

The birds, he said, dance "by certain trees . . . which have an immense head of spreading branches and large but scattered leaves, giving a great space for the birds to play and exhibit their plumes. On one of these trees a dozen or twenty full-plumaged male birds assemble together, raise up their wings, stretch out their necks, and elevate their exquisite plumes, keeping them in a continual vibration. Between whiles they fly across from branch to branch in great excitement, so that the whole tree is filled with waving plumes in every variety of attitude and [illegible].

"The bird itself is nearly as large as a crow and is of a rich chestnut-brown color. The head and neck is of a pure straw yellow above and rich metallic green beneath. The long plumy tufts of golden-orange feathers spring from the sides beneath each wing, and when the bird is in repose are partly concealed by them. At the time of its excitement, however, the wings are raised vertically over the back, the head is bent down and stretched out, and the long plumes are raised

Bird of Paradise Plumes Add Color to the Glittering Court of Nepal

[illegible]

Scientists Studying Paradise Birds of New Guinea's Lowland Forests Must Cope with Floods Like This

[illegible]

In Such a Paddle-power "Sidewheeler" the Author Toured Geelvink Bay, Netherlands New Guinea, in Search of Paradise Birds

Bronx Zoo's Twelve-wired Is Old French to Vote

[illegible] at the time he arrived at [illegible] Twelve-wired, gets its name from the [illegible] black [illegible] make it look equal [illegible] for [illegible] exception [illegible]

up and expanded till they form two magnificent golden fans striped with deep red at the base, and fading off into the pale brown and of the [illegible] and softly waving points.

[illegible] overshadowed by their [illegible] yellow head and emerald [illegible] which waves [illegible] When seen [illegible] the bird of paradise [illegible] name and must be ranked [illegible] most beautiful and most wonderful [illegible]

Red Bird of Paradise, Page 254

[illegible] bird of paradise [illegible] from Waigeo Island [illegible]

[illegible] head are [illegible] tufts [illegible] curved [illegible] The [illegible] of [illegible] from [illegible]

Emperor of Germany's Bird of Paradise, Page 255

[illegible] Emperor [illegible] Kaiser [illegible] Bird of Paradise [illegible] and was [illegible] close [illegible] collections.

The green feathers of [illegible] were [illegible] Like [illegible]

Twelve-wired Bird of Paradise, Page 256

The [illegible]

[illegible] a side, well [illegible]

The male's upper [illegible] a purple [illegible] which has [illegible] caprey or [illegible]

In [illegible] male [illegible]

[illegible] the male in adult plumage, the female all brown barred with black as in most of the species. They were in adjo[illegible]

and the male spent his time feeding the female through the wire. Every time he passed her a small bit of fruit, he seemed to leave his bill open purposely afterward as if to impress her with the greenish color of the lining. Both birds had an amusing habit of tossing the food into the air and then catching it again to eat it, the bill sometimes making a loud snap.

The twelve-wired bird of paradise is found all over coastal New Guinea and the neighboring island of Salawati. It is the one bird of paradise which frequents sago palm swamps and brackish mangrove areas near the sea.

Dr. Francis Henry Hill Guldemond, in his account of New Guinea in the 1880's, reported that the natives caught twelve-wires for him by slipping up to their roosting places at night and putting a cloth over the quarry's head. This story seems no harder to believe than the one my boys told me about catching six-plumes by hanging a loop of string over a branch (page 247). Either catching paradise birds is actually simple if you are an agile Papuan, or else they all know how to tell good stories in New Guinea.

Six-plumed Bird of Paradise, Page 257

These birds are so named because of the six long hairless plumes that spread out from the back of the male's head. Each plume is tipped with a small racquet.

Six-plumed birds of paradise are mountain dwellers, about as big as a magpie, belonging to the genus *Parotia*. They are found all over the main island of New Guinea at altitudes never lower than about 3,000 feet, and usually considerably higher.

In color they are very uniform. Adult males are always velvety black, with a small metallic shield of feathers, glittering bronze green, and another in the sun, on the breast. Just behind the bill on the crown of the head there is a small tuft of feathers which varies from silver to gold among the different species. These stand erect when the bird is excited. Females are always dull brown with black barring as are young males.

The bill is short, as is the tail in all except one species. Lubiensis, from the eastern mountains, has a tail as long as the body.

The six-plumed makes strange harsh cries. When mine were first caught in the Tamrau Mountains they shrieked so incessantly that I could hardly bear it. It was worse [illegible] the first of all bird calls.

At Last the Rare Ribbon-tailed Greets the Public

Some had been seen alive outside New Guinea's central [illegible] Feather "trains" are two feet long (page 266)

My birds were always excited during a storm, and often called loudly if there was thunder. There is an old legend among the Malays that to see the six-plumed bird of paradise is to be protected against thunder and lightning.

In spite of their curious dance (page 247), which is part of the display of the male to the female, there are several records of hybrids occurring in nature between the six-plumed and two other genera of paradise birds. However, these hybrids are undoubtedly very rare, probably sterile, and only serve to accentuate the need of some mechanism, display or otherwise, to keep the paradise birds from interbreeding.

King Bird of Paradise, Page 258

During the war GI's became acquainted with the jungles of New Guinea for the first time. If by chance they ever saw a bird of paradise, it may well have been the king. This little ruby gem, about six inches long, is found all over the lowlands of New Guinea up to 2,500 feet, on the neighboring Aroe and western New Guinea islands, and on Japen Island just south of Biak in Geelvink Bay (page 271).

The species (*Cicinnurus regius*) is divided into six slightly varying subspecies. All have brilliant red upper parts, white abdomen, small green-tipped fans concealed under the wings, and two wirelike tail feathers ending in small metallic-green rackets. The legs are light violet-blue.

When the male displays, the feathers under each wing stand out from the sides like small shields.

All of the races are distinguished by a prolongation of the feathers on the front of the head almost reaching the end of the short yellow bill. Like other brightly colored birds of paradise, the males have dull-plumaged mates and young.

In young males the strange tail feathers have an interesting way of developing, as if to presage the coming of the fully developed racquet tail of the adult. Although all brown, like the rest of the bird's plumage, the two central tail feathers become prolonged and slightly curved. The shaft is nearly, but not quite, a naked wire; small traces of the vanes of the feather remain on each side along the shaft.

Strangest of all, when the adult male molts and starts growing new tail feathers, these appear at first in a tightly curled sheath which looks like a miniature pair of spare tires carried on the rumble seat.

The Malay name for this bird is *burung kepling*, which means "money bird" and undoubtedly refers to the old days of the plume trade. It is possibly the same king bird Pliny reported in his *Natural History*. It was said to live somewhere in "India," and its plumage was as red as a blowing coal. This red plumage was supposed to give divine protection in combat when worn on the hat or arms.

Wilson's Bird of Paradise, Page 258

One of the smallest of all birds of paradise is the little Wilson's (*Diphyllodes respublica*), found only in the lower hill forests of the islands of Batanta and Waigeo off the west coast of New Guinea's Vogelkop, or "Bird's Head" peninsula.

Its Malay name is *burung kepala kraus*, or "cross head." The top of the head is bald, and the skin is rich cobalt blue with a strange pattern, a sort of double cross of minute black velvety feathers. The rest of the head is of equal brilliance. The male has a sulphur-yellow mantle and pure red back and wings. Breast plumes are dark metallic green, and there are two curled projecting tail feathers.

Nothing is known of the habits or courtship of the Wilson's, although it presumably behaves in much the same way as the magnificent, *Diphyllodes wilsoni*, its close relative on the mainland of New Guinea (page 261).

Georg Stein, a German bird collector who worked on Waigeo in the 1930's, observed the Wilson's but has only fleeting glimpses of it as it flew away in the forest. Some day perhaps a good field student will bring back the first real observations on these curious little birds.

An amusing sidelight on the name *respublica* was given by Charles Lucien Bonaparte, Napoleon's nephew, who for a time resided in the United States. Bonaparte, the ornithologist who first described the species, was tired of the fact that so many birds of paradise had been named after royalty, or at least nobility, and so decided to name his new bird after "the Republic." He went on somewhat sourly, however, to note that the Republic was somewhat less than perfect owing to the machinations of "so-called Republicans." He concluded that "even though a paradise in Republic does not exist, at least there is now a *Paradisea respublica*."

Sicklebill, Page 259

The largest birds of paradise are the sicklebills, which consist of the genus *Epimachus* divided into two species. One *fastosus*, with its geographical races, occurs in the mountains of northern and western New Guinea; the other, *meyeri*, with two races, is found in southern and eastern New Guinea.

These birds never seem to live below about 5,000 feet. Records of their occurrence as high as 9,500 feet are not uncommon.

As the name indicates, the bill is about three and a half inches long, thin and curved. This genus and another one, *Drepanornis*, are the only really sickle-billed birds of paradise.

The most striking feature of the male's coal-black and lustrous plumage is the pair of "wings" which arise from the flanks and are often concealed by the true wings. When the bird displays to its soberly colored mate, these sets of soft metal-tipped feathers can be spread out so that they appear to be auxiliary wings.

A number of sicklebills have been kept in captivity, both in England and in the United States, and on one occasion a pair made a nest and laid an egg in New York's Bronx Zoo.

Dr. Crandall, the General Curator, recently described the display of the Zoo's male bird, which differs from all displays previously described in

Tonsured New Guinea Chief Wears More Hundreds of Dollars' Worth of the World's Strangest Treasures on His Nose

[illegible]

that the "wings," or shields of metallic-tipped feathers, are joined together at the top over the head at the climax of the display. At the same time the bird rapidly moves his outer tail feathers in a scissorlike motion. Then the bird opens his long bill, which is framed in the center of this luminous shield of feathers, to reveal the startling yellow-green lining of the mouth.

The first sicklebills in captivity were a pair captured by Walter Goodfellow, naturalist and explorer, in 1909 in New Guinea. They were taken to Scotland and kept alive for a time in the first large private collection of these birds, maintained by Mr. E. J. Brook at Hoddum Castle.

The sicklebill is still today one of the rarest and most exotic appearing of all the birds of paradise (page 247).

Lesser Superb Bird of Paradise, Page 260

Outstanding among the small birds of paradise is the lesser superb (*Lophorina superba*), found in all the mountains of New Guinea from about 3,000 feet up to at least 6,000 feet. In size it is comparable to a wood thrush or a starling.

The male is coal black with two sets of plumes—one a breast shield of glossy metallic green-black feathers, the other a cape of velvety-black feathers which can be raised over the head. In display the two sets of feathers are erected so as almost entirely to surround the head. The bird looks as if head and bill were sticking through the bottom of a saucer.

So strong is the muscular attachment for erecting these mats of feathers that it is possible for this bird to fly from one perch to another with the cape and breast shield partly raised. I saw one do just this in an open bit of jungle in the Tami River Mountains.

As in many other species, the male opens his mouth in courtship to display the colorful inner surface. The female is dark brown, banded with black on the paler brown underside.

Like the six-plumed (page 257), the superb makes harsh attracting calls at times, although the noise is not quite so ear splitting. The two species are obviously closely related and there are several records of hybrids between them.

The superb has more records of hybrids with other species than any other bird of paradise. Four species are known to cross with it. Besides the six-plumed, these are the magnificent, the wattled (*Paradigalla*), and the ribbon (*Cicinnurus*). The females of all these species are notably similar in size and color pattern, and the times and breeding seasons of all overlap.

Magnificent Bird of Paradise, Page 261

This bird (genus *Diphyllodes*) is closely related to the King (page 258), so closely, in fact, that a large number of hybrids have been recorded between the two genera. The females of the two are closely alike in form and coloration. Another close relative is the Wilson's (page 258).

Mostly brown on the upper surface, the male magnificent has a wide cape of bright-yellow feathers spreading out from the back of the neck. The breast is rich lustrous green, and there are two tail wires as in the king, although slightly different in shape.

This bird is found in the rolling foothills and mountains up to about 4,000 feet, all over New Guinea and the western islands.

Dr. A. L. Rand, of the Chicago Natural History Museum, has written of watching the male bird in his display ground, a task which occupies most of his time during the breeding season. From an area of forest floor, 15 feet or more in diameter, all leaves, twigs, and small plants are removed by the bird in degreen-to-be. Saplings are usually plucked clean of leaves and often stripped of their bark, so that they are dead or dying.

On the rim of this display ground the bird sits for hours at a time, preening [illegible] calling at intervals. The female [illegible] and mating takes place, accompanied by an elaborate ritual of display on the part of the male. The cape of yellow feathers is stretched and erected until it surrounds the head. The green breast feathers are spread and flattened and the tail vibrated.

Occasionally the male perks at the female and then opens his short bill to expose the yellowish-green color of the inside of the mouth.

Sometimes, according to Dr. Rand, the young male bird, which is dull-colored like the female, comes to the display ground and rather pathetically attempts to display when the adult male is away.

Standard-wing Bird of Paradise, Page 262

Alfred Russel Wallace discovered this strange bird in 1858 on the island of Batjan, more than 200 miles west of New Guinea in that intermediate archipelago known as the Moluccas.

Through the graciousness of the sultan of this small, wild island, Wallace had been given a thatched hut to live in while he collected specimens of the unknown fauna of the virgin forest—mysterious and inviting, which covered the whole isle.

"Just as I got home," Wallace wrote, "I overtook Ali returning from shooting with some birds hanging from his belt. He seemed much pleased and said, 'Look here, sir, what a curious bird!' holding out what at first completely puzzled me.

"I saw a bird with a mass of splendid green feathers on its breast, elongated into two glittering tufts; but what I could not understand was a pair of long white feathers, which stuck straight out from each shoulder. Ali assured me that the bird stuck them out this way itself, when fluttering its wings, and that they had remained so without his touching them.

"I now saw that I had got a great prize, no less than a completely new form of the bird of paradise, differing most remarkably from every other known bird. The general plumage is very sober, being a pale ashy olive, with a purplish tinge on the back; the crown of the head is beautifully glossed with pale metallic violet, and the feathers of the front extend as much over the beak as in most of the family. The neck and

Golden-orange Plumes Adorn Papuans for a Feast and Dance

[illegible]

[illegible]

King of Saxony's Bird of Paradise, Page 263

[illegible]

black below and brownish black. Underneath it is paler, more brown.

If this were all, it would be hard to know that the bird was a member of the paradise family. But from the back of the head spring two long feathers, the like of which is not found anywhere else in the bird kingdom. These feathers, if feathers they can be called, are about two feet or more in length, and consist of a white shiny [illegible] pendant from it. The effect is curiously lace-like (page 275).

It would be fascinating to watch these strangely garbed little birds to find out what they do with these feathers and in what way they show them off to their lady friends.

Magnificent Riflebird, Page 264

The magnificent riflebird (*Ptiloxenus magnificus*) is one of the few species of paradise birds which extend outside of New Guinea; it is found also in the Cape York Peninsula, Australia.

This species is somewhat less showy than many of the others. It is mostly black, with two patches of burnished metallic feathers on the neck and breast and on the top of the head. Two small tufts of rather disintegrated lanceolate plumes of a brownish cast spring from the sides of the breast, but they are not prominent as in so many of the other species. The display, however, is one of the most exciting of all.

The loud call of this bird is one of the most noticeable sounds of the lowland jungle in New Guinea; it can be heard for several hundred yards. The call is two-syllabled, the first an ascending note rather drawn out, a sort of "whuck"; the second a short descending note, almost reversing the scale. Every time I go into the bird room of the Bronx Zoo in New York and hear the loud call of these magnificent riflebirds, I am transported immediately to the New Guinea jungle.

As in almost all birds of paradise, the female is brown on the upper surface, in this case a rich reddish brown, the underparts is a pale ashy color, closely barred throughout with narrow, wavy black bars.

D'Albertis's Bird of Paradise, Page 265

One of the least known species is *Diphyllodes alberti*, also called the short-tailed sickle-bill. Its home is along the north coast of New Guinea, as far as the mountains of the southeastern part of the island.

A lowland species, it lives at altitudes of 4,000 to 5,000 feet, although there is an allied species *D. speciosus*, in the lowlands of the north coast. Both are closely related to the larger long-tailed sickle-bills (page 271).

Alberti seems to be a solitary bird, like the sickle-bill, but is less common in its range than that relative. It is apparently a rare bird, and difficult to find.

Dr. Ernst Mayr, one of the few to see this species alive, tells me it has a remarkable call, a loud singing, yodeled note which can be heard for long distances.

Ribbon-tailed Bird of Paradise, Page 266

Astrapia fraenata is the most aristocratic member of the gorgeted birds of paradise, a group of black short-billed birds with long tails, rather closely related to the sickle-bills (page 271).

There are five species of *Astrapia*, all from the high mountains of New Guinea, where they are found up to about 11,000 feet. They have metallic ruffs of feathers on neck and breast. Tails are long and sometimes quite broad, but the ribbon-tail with its trailing white streamers is the most striking of all.

The sight of a male flying out through the tree ferns in the jungle, long white ribbon feathers streaming behind, must be like something from another world of fable and fantasy.

Ribbon-tails are apparently quite tame in the wild state, as shown by the ease with which they were best seen when white patrol officers and gold prospectors went into their territory a few years ago (page 718). They live in the most inaccessible areas of the headwaters of the Sepik River and the mountains near Mount Hagen.

Only in the years just before the recent war and subsequently has this area been accessible to planes. Now there is a good landing strip in the valley near these mountains. In early 1948 Mr. E. J. L. Halstrom,* a businessman from Sydney, Australia, managed to fly in and persuade the local Papuans to capture some male ribbon-tails. These birds are now in his aviary near Sydney, the first to be seen outside of their own lush, far-off mountains (page 273).

Princess Stephanie's bird of paradise, a species of the gorgeted, is one of the few birds of paradise known to have nested in captivity. This is the more remarkable because specimens have been brought alive from New Guinea only twice. A pair nested three times at Hoddam Castle in Scotland, laying a single egg on each occasion.

* See "Sleep Airlift in New Guinea," NATIONAL GEOGRAPHIC MAGAZINE, December 1949.

INDEX FOR JULY–DECEMBER, 1949, VOLUME READY

Index for Volume XCVI, July–December, 1949, of the NATIONAL GEOGRAPHIC MAGAZINE will be mailed upon request to members who bind their copies as works of reference.

NATIONAL GEOGRAPHIC SOCIETY

GEOGRAPHIC ADMINISTRATION BUILDING
SIXTEENTH AND M STREETS NORTHWEST, WASHINGTON, D. C.

ORGANIZED FOR THE INCREASE AND DIFFUSION OF GEOGRAPHIC KNOWLEDGE

To carry out the purposes for which it was founded [illegible]

Articles and photographs are desired. For general [illegible]

In addition to the articles and photographic essays constantly being made, The Society has sponsored notable high and scientific expeditions, some of which required years of field work to accomplish their objectives.

The Society's geologic expeditions have probed back [illegible] to a period nearly eight centuries before Columbus crossed the Atlantic. By dating the rings of the giant redwood and sequoia trees, [illegible] researches [illegible] have provided the clues for these hundred years.

In Mexico, The Society and the Smithsonian Institution [illegible] discovery [illegible] with [illegible] of Aztecs for which we have no date. This [illegible] closely contributed to Mayan chronology with a date which means [illegible] of civilization. It [illegible] America and proves a great center of early American [illegible]

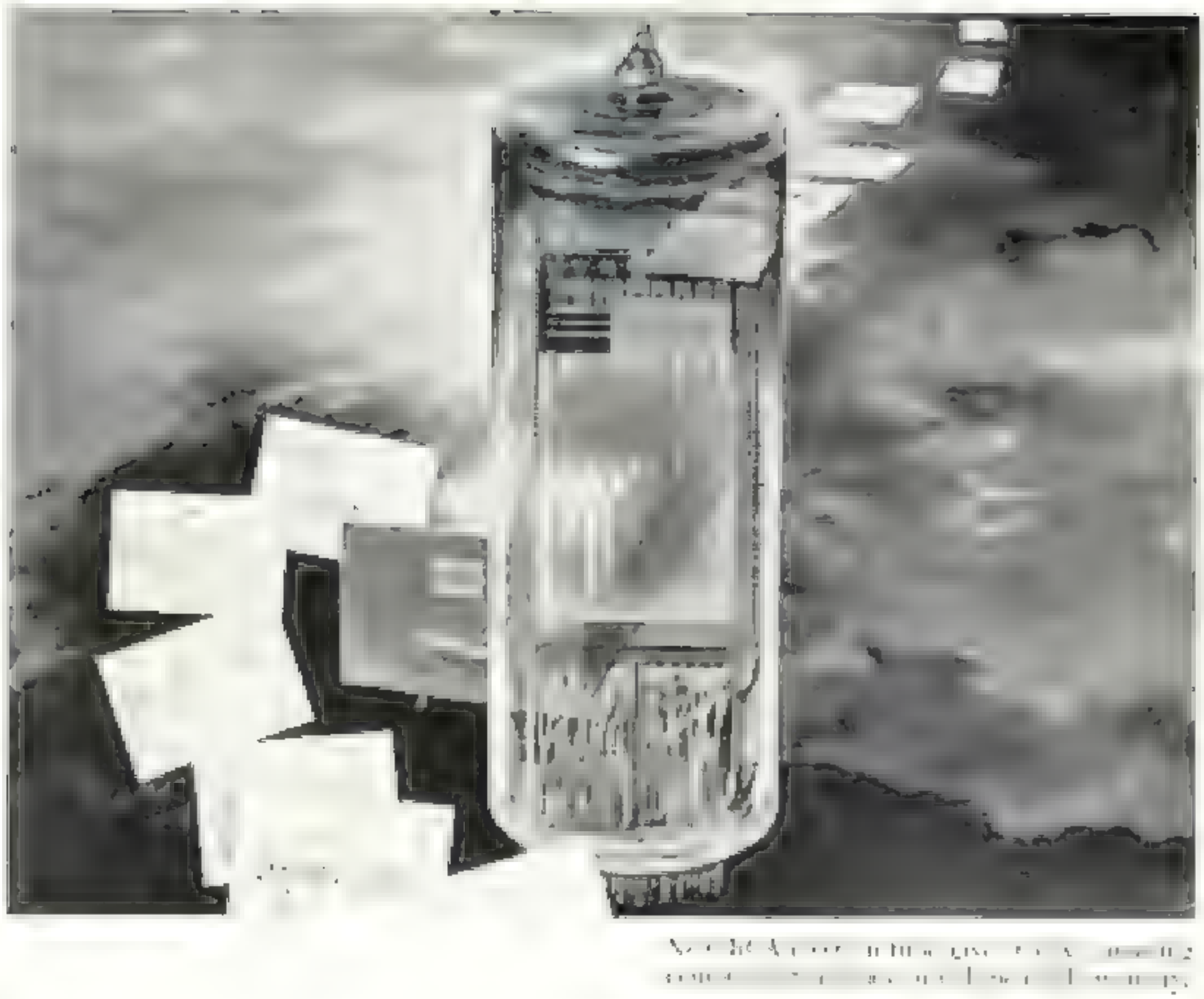
On September 21, 1936, [illegible] a high spot in a [illegible] near Aberdeen, [illegible] from a ramp on an [illegible] Brazil, [illegible] and observed the solar eclipse of 1937. This was the seventh expedition of The Society to observe a total eclipse of the sun.

The Society cooperated with Dr. William Beebe [illegible] Bermuda during which a world's record depth of 3,028 feet was attained.

The Society granted $25,000, and a similar $25,000 was given by individual members, for the expedition when the congressional appropriation for the purpose was insufficient, and the figures of the giant sequoia trees by the Japanese Society of Science in Nikko National Park of Japan were [illegible] for the [illegible]

One of the world's largest meteorite and glass craters outside the polar regions was discovered in Alaska and [illegible] by Dr. Harold Weaver, while exploring for The Society and the Harvard Institute of Exploration. [illegible]

IMAGINE ABOVE



Tube with a memory keeps answers on file

So complex are present scientific studies—such as in atomic research—that just work[illegible] the "[illegible]" [illegible] times.

[illegible] is found in [illegible] computers, capable of adding or multiplying numbers as [illegible] thousand billions in [illegible] kept "on file" [illegible]

Such a "file" now exists in the Selectron [illegible] developed at RCA Laboratories. [illegible] electronic memory [illegible] which is [illegible] memory [illegible] of [illegible] memory.

Uses of RCA's Selectron tube are many. It will help [illegible] scientists and [illegible] new and needed [illegible] [illegible] proportions. It will [illegible] [illegible] to [illegible]

For your benefit:

[illegible] RCA [illegible] leadership [illegible] incoming [illegible] value beyond price to any product or service of RCA [illegible]

RADIO CORPORATION of AMERICA

World Leader in Radio — First in Television

"Meet the National Geographic—It [illegible] you"

New Blue Bird On The Wabash

This is the Wabash Railroad's new Budd-built, all-stainless steel Blue Bird, on its winging flight between St. Louis and Chicago. The Blue Bird will make the round trip daily between these two great terminal cities, adding to the completeness of Wabash service and presenting to its passengers comfort and luxury in rail travel previously unknown.

For the Blue Bird is the latest in the roster of distinguished name trains which Budd has created for the modernization of American railroads. Four of its cars are Vista-Domes, giving passengers an unobstructed view of the Illinois countryside, picturesque bluffs and river scenery along the way.

Like all Budd-designed passenger equipment, this train illustrates a principle that better products are made of ideas as well as steel. This was true of the all-steel automobile body which Budd originated and which has made Budd the largest independent builder of body components in the world. It was true of the steel wheel which Budd developed to take the place of wood. It has been demonstrated in the Budd Disc brake, and in stainless steel highway trailers.

In the railroad field Budd ideas were revolutionary. Ideas that attract passengers by making rail travel more inviting. Ideas that permit faster schedules and yield substantial operating economies. It was Budd vision which led to the whole concept of the modern stainless steel lightweight streamliner. And Budd today is the only car builder who employs the superior strength of stainless steel to achieve lightweight construction without sacrifice.

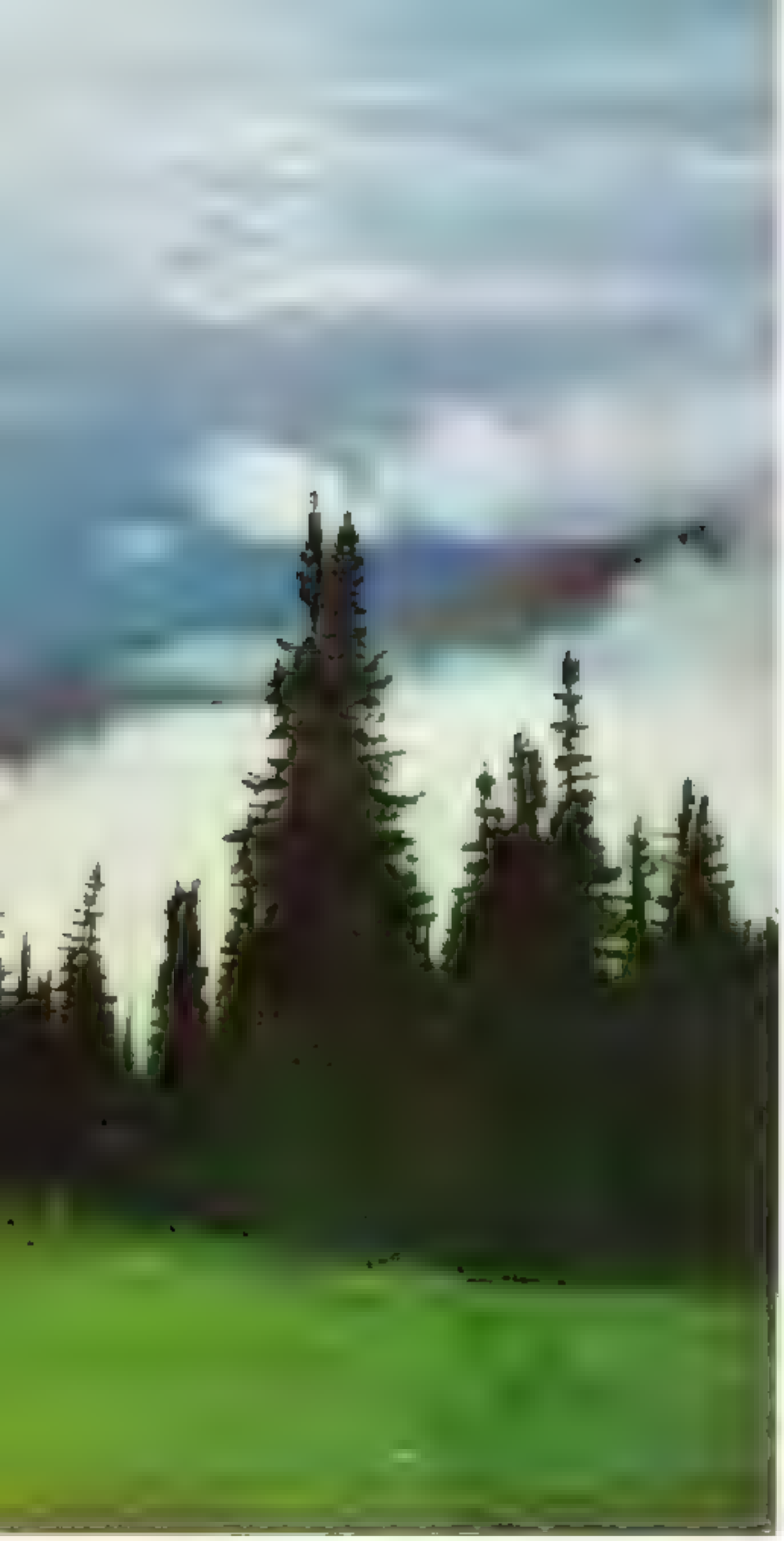
The Budd Co., Philadelphia, Detroit

Budd

Explore... Play... over the border in Canada

[illegible]

Safe warm beaches call you to a fascinating Canadian coastal province. [illegible] swimming and boating and [illegible]



You'll find exciting new vacation vistas, get cond d "close-ups" of Nature at her unspoiled best

7 VACATION POINTERS –
ALL POINTING TO CANADA IN 1950

1. [illegible] 2. [illegible]
3. [illegible] 4. [illegible]
5. [illegible] 6. [illegible]
7. [illegible]

Historic landmarks like Fort Wellington, Ontario, [illegible] are reminders of Canada's romantic past. Old ships, [illegible] and [illegible] [illegible] crafts [illegible] Canada's [illegible] preservation.

National Parks [illegible] and [illegible] [illegible] green spaces. Here in [illegible] [illegible] and golf and fish

Have you ever said: "I'm drinking too much coffee"?

You probably have . . . if you're like most people who love a good cup of coffee.

For coffee is so enticing, so delightful, so hospitable a beverage that one cup just seems to lead to another.

And yet . . . and yet . . . you realize that you must be wary, lest you reach the point where the caffein in coffee might make you sleepless, nervous, and "out of sorts."

So, when you are nervous and tense . . . wakeful at night . . . you wonder, naturally, if coffee is to blame. Should you limit yourself to a certain amount? To certain times of day? Should you give up coffee *altogether?*

DRINK SANKA COFFEE

Sanka Coffee brings you two great pleasures. The first is the rich, satisfying, and very special flavor-goodness that coffee-lovers get only from real coffee.

The second is the pleasure of never worrying about how much coffee you drink or when you drink it.

You can drink all you want—one cup or six; morning, noon, or midnight—and never give a thought to possible caffein-effects!

REAL COFFEE–97% CAFFEIN–FREE

The reason—as millions know—is that Sanka is wonderful coffee *with the caffein taken out.*

Sanka will free your mind completely from the slightest question about your coffee-drinking habits.

Why not start drinking Sanka Coffee tomorrow? You have nothing to lose . . . and possibly a great deal to gain.

Sanka Coffee

Real coffee with the worry taken out.
Drink it and sleep!

Products of General Foods

OLDSMOBILE ROCKETS AHEAD!

GLAMOROUS NEW FUTURAMICS!

BRILLIANT "ROCKET" ENGINES!

NEW WHIRLAWAY HYDRA-MATIC DRIVE!

[illegible]

Now

IMPROVED ENVELOPES

...BETTER SEALING

[illegible]

[illegible]

[illegible]

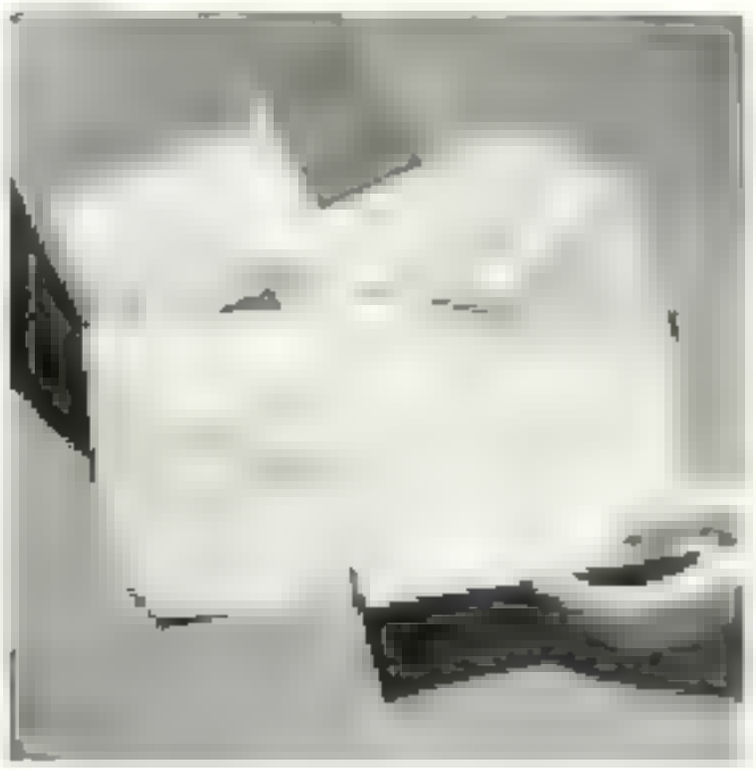
THE AMERICAN STATIONERY COMPANY
[illegible] PARK AVENUE • [illegible]

American Stationery

The [illegible] Stationery at the [illegible] Box

STANDARD PACKAGE

[illegible] SHEETS [illegible] $1.00



ENVELOPE PACKAGE

[illegible] ENVELOPES ONLY [illegible] $1.00

DELUXE PACKAGE

[illegible] SHEETS [illegible] All neatly [illegible] $2.00

"I have three good reasons for going Pullman"

COMFORTABLE, DEPENDABLE, AND—ABOVE ALL—SAFE!

it's

PILGRIMAGE TIME

in MISSISSIPPI

NATCHEZ — March 4 through April 7, 1950

Six tours [illegible] Pilgrimage Tours [illegible]

COLUMBUS — April 15 and 16, 1950

[illegible] April 20

HOLLY SPRINGS — April 23 through April 30, 1950

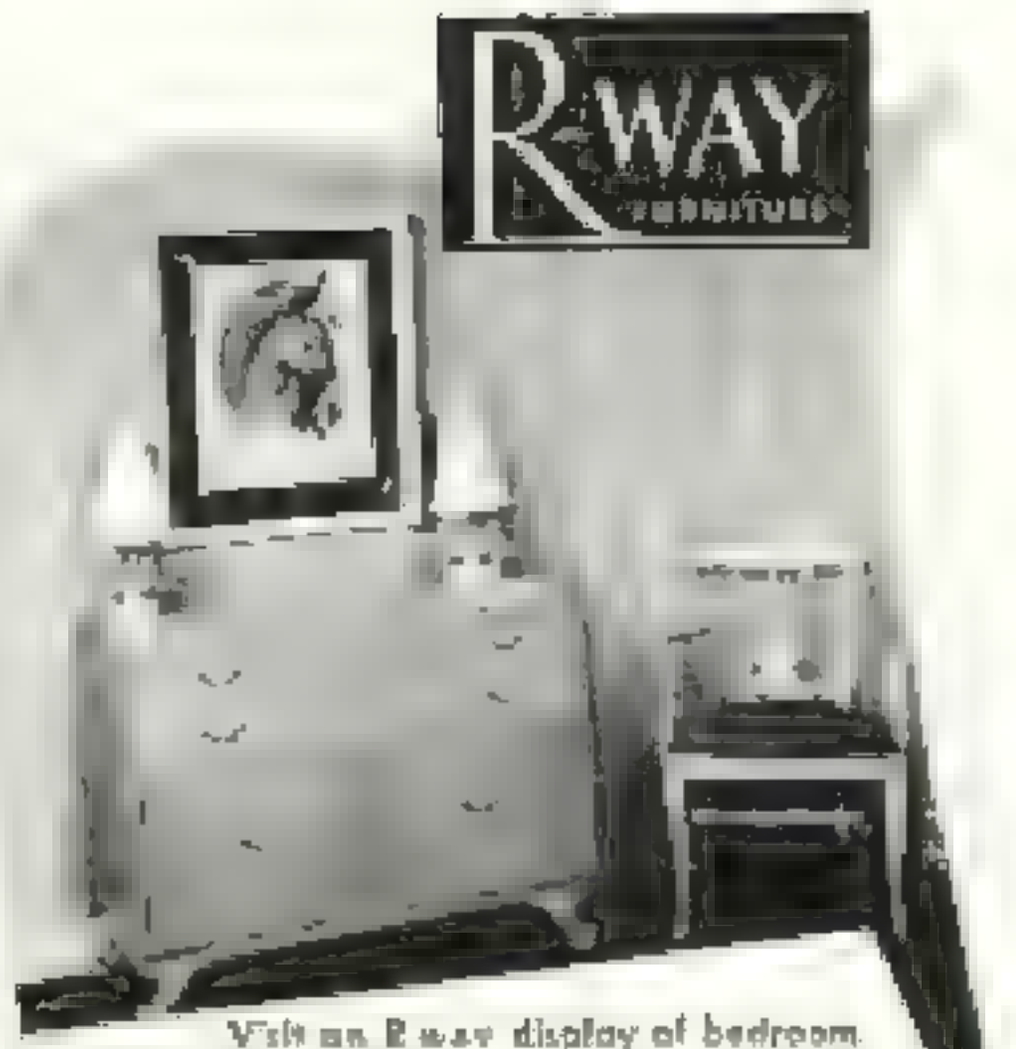
[illegible]

[illegible]

Name _____

Address _____

City _____ State _____



Visit an R-way display of bedroom and dining room furniture. We offer style, quality and value far in excess of the price. Purchases arranged only through authorized R-way dealers.

R-WAY

[illegible] Showrooms in Boston • Chicago • Cleveland • Cleveland • Dallas • Detroit • Kansas City • Milwaukee • Minneapolis • New York • Philadelphia • Pittsburgh • St. Louis • Washington

Ten years known as [illegible]

SEE more than you've ever seen before . . .

TRAVEL

LINJEBUSS

THROUGH **EUROPE**

SEE ALL of Europe—Paris, Rome, Scandinavia, Low Countries, Germany, the Alps, the Riviera . . . quaint villages . . . [illegible] cities. [illegible] coach completely equipped for [illegible] snack bar, lavatory, two drivers, English speaking hostess. Most [illegible] companies leave London, [illegible] to see the REAL Europe!

LINJEBUSS

Swedish Transcontinental Bus Lines

For descriptive booklet

SEE YOUR TRAVEL AGENT

or write A. Johnson & Co. Inc. Gen. Agents

Dept. B, 630 Fifth Ave., New York 20, N. Y.

. . . If you trust ordinary metal files to protect any vital records against FIRE!

[illegible]

[illegible]

[illegible]

Here's Positive Protection . . .

[illegible]

The Mosler Safe Co.

Since 1849

[illegible] 5th Ave., New York 1, N. Y.

Largest Builders of Safes and Vaults in the World

Builders of the U. S. Gold Storage Vault Doors at Fort Knox, Ky.

FILL OUT AND MAIL—TODAY!

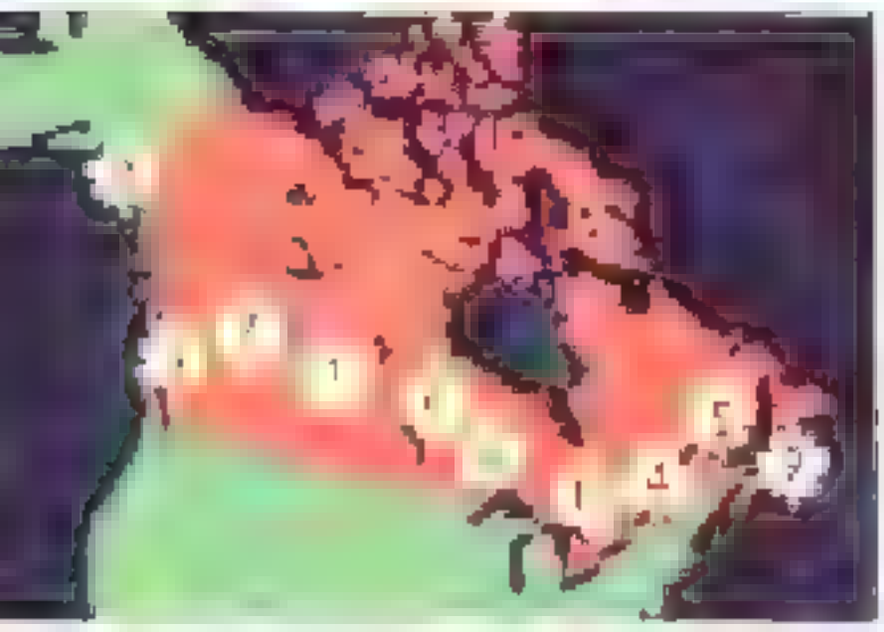
[illegible]

[illegible]

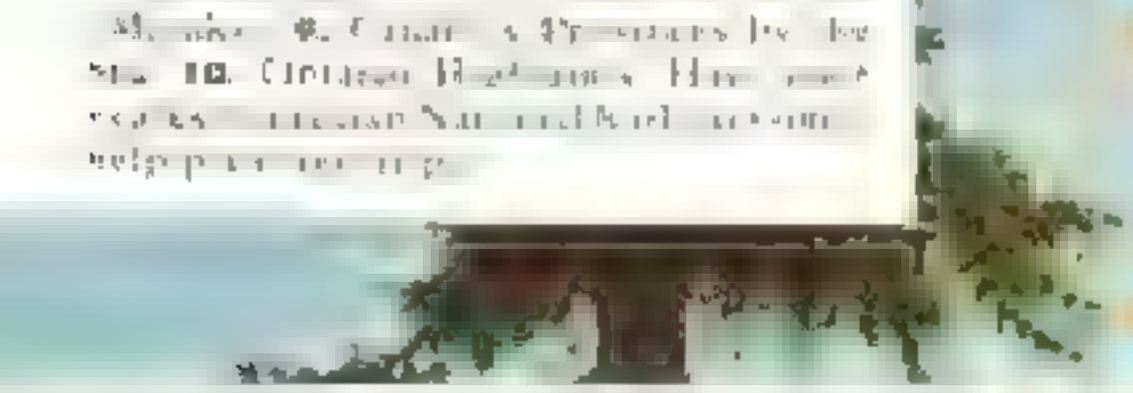
"SHOWPLACE OF THE CANADIAN ROCKIES"

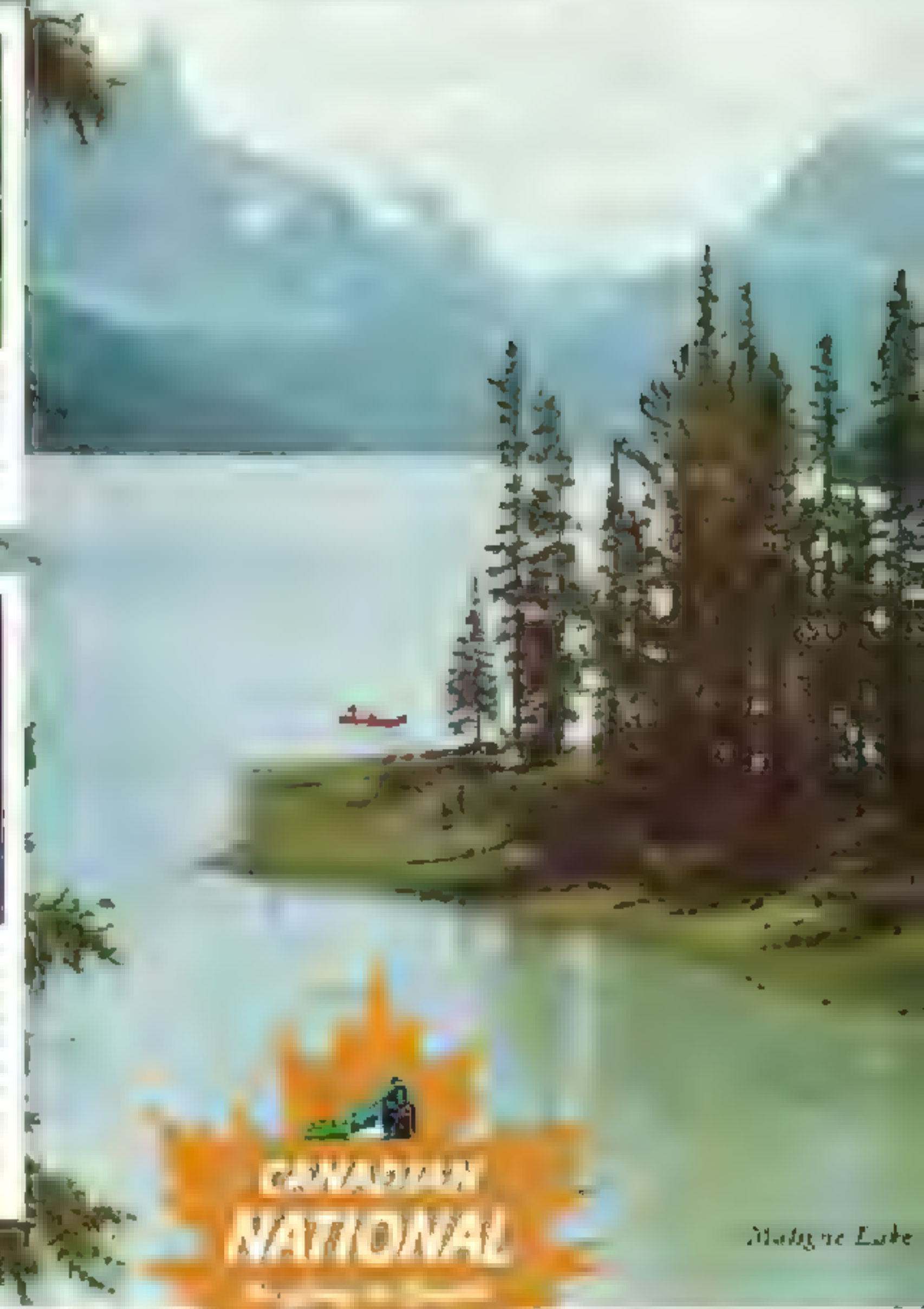
JASPER*

GOLF [illegible] Jasper Park Lodge [illegible] Mountain [illegible] Jasper National Park.



CHOOSE ANY [illegible] **1.** [illegible] Canada **2.** [illegible] **3.** [illegible] **4.** [illegible] **5.** [illegible] **6.** [illegible] **7.** [illegible] **8.** [illegible] **9.** [illegible] **10.** [illegible] help you [illegible]





Medicine Lake

CANADIAN NATIONAL

"JASPER . . . ONE OF CANADA'S 10 TOP VACATIONS!"

[illegible] world travelers [illegible] Medicine Lake [illegible] Jasper Lake [illegible] "[illegible]" And remember, [illegible]

It won't be long now!

Let's settle this vacation thing right now! In Pennsylvania you'll find 13 [illegible] ocean. [illegible] more than [illegible] mountain lakes, [illegible] In Pennsylvania you'll enjoy hunting, boating, [illegible] from archery to [illegible] the mills, mines, and machinery of the world workshop [illegible] farms and decorated homes of the "Pennsylvania Dutch"; the Liberty Bell; Independence Hall and others of the nation's most historic spots. It's not just one thing to remember . . . it's many.

YOU'LL FIND MORE IN

Pennsylvania

PENNSYLVANIA DEPARTMENT OF COMMERCE
SUITE 202, HARRISBURG, PA

[illegible]

Name _____

Address _____

City _____

The Perfect Winter Vacation

[illegible] warmth . . . [illegible] ranch style, [illegible] of sun-[illegible]

If [illegible]

Valley of the Sun Club, 493 Chamber of Commerce Bldg.

700 passenger-carrying

FREIGHTERS

LINERS AIRPLANES

[illegible]

HARIAN PUBLICATIONS
145 Concourse, Greenlawn, Long Island, N. Y.

SAFE WALKING...

for invalids and recuperating persons

The [illegible] throughout [illegible] $9.95 [illegible]

Anchor Mfg. Co.
50 W. Water St., Akron, Ohio

Through IBM research and development, the [illegible] abilities of electron tubes have been put to work [illegible]

Electron tubes—fast, versatile, accurate—are used in the IBM Machines pictured here to calculate [illegible] to "remember" the answers to intricate computations to follow long series of instructions [illegible] rapidly with amazing precision.

IBM Electronic Machines [illegible] between questions and answers—helping science and industry produce more great things for more people.

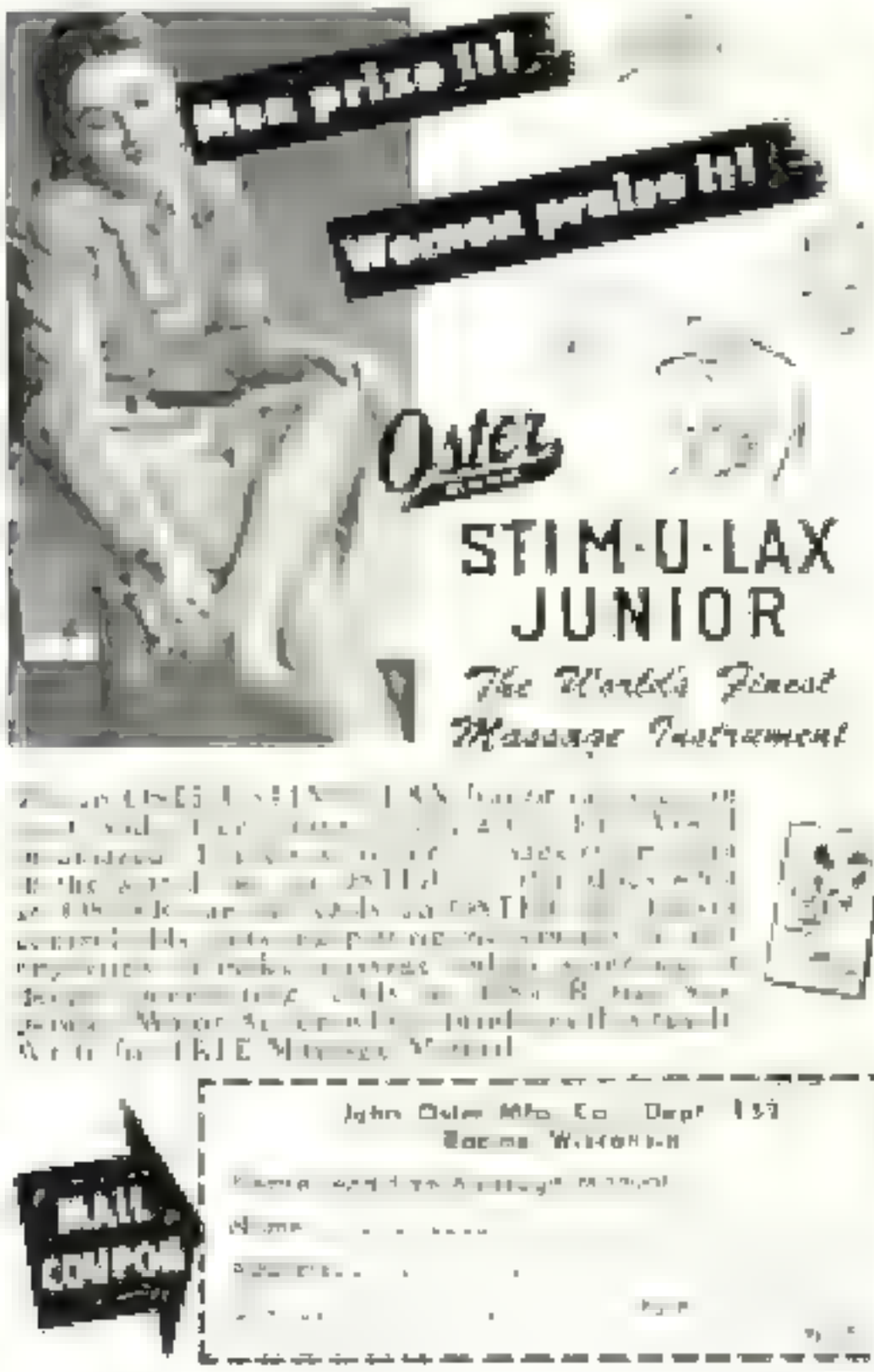
The IBM machines illustrated use electronic principles. Clockwise from the top, they are: Electric Time System with Electronic Self-regulation, Alphabetical Calculator, Statistical Machine, Card-programmed Calculator, including Calculating Punch, Punched Card Sorter.

For descriptive literature, write to [illegible]

IBM

International Business Machines Corporation
590 Madison Avenue • New York 22, New York


Concert Hall REPRODUCTION
you'll be Front-row Center with your new
Motorola
FM-AM TABLE RADIO
make sure it's a
Motorola
30 YEARS OF ELECTRONICS ACHIEVEMENT GUARANTEE MOTOROLA HIGH QUALITY


Men prize it!
Women praise it!
Oster
STIM-U-LAX
JUNIOR
The World's Finest
Massage Instrument
MAIL COUPON

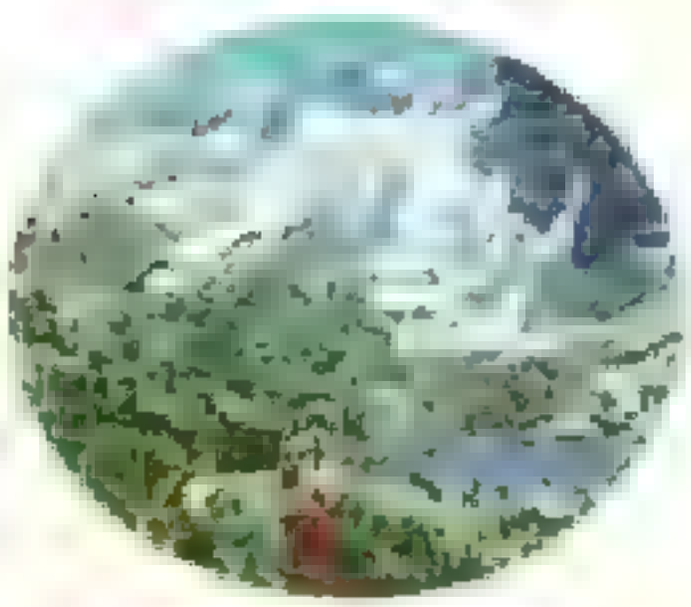

Free A POSTAL GETS IT!
Send for this 96-page book on Fishing Tips
Fishing Tips
JOHNSON
SEA-HORSE


HOT SPRINGS
NATIONAL PARK
ARKANSAS
ARLINGTON
HOTEL AND BATHS

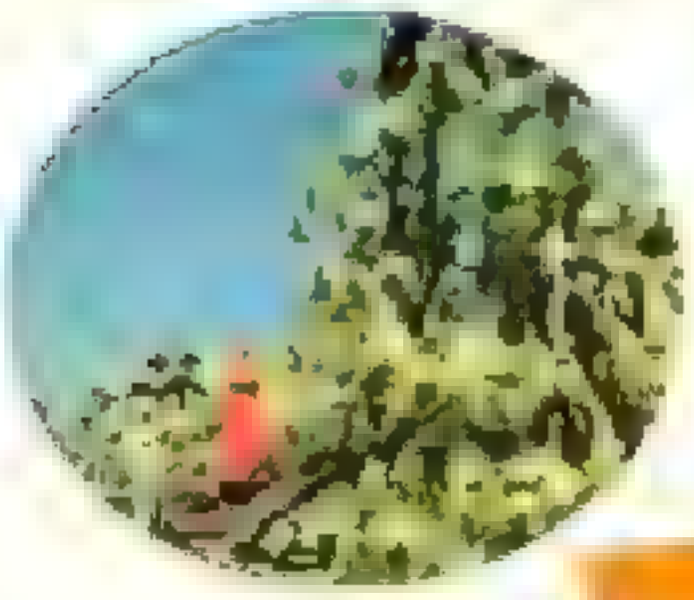
WARM, SUNNY OUT-OF-DOORS WEATHER

SUN TANNING AT THE SEASHORE

HIGH MOUNTAINS, LAKES, TIME RESORTS



THE DESERT · BEST OUTDOOR THRILL WAYS



SURFING, TENNIS AND MOUNTAINS

THE CITRUS EMPIRE · AVOCADOS · DATES

WORLD FAMOUS HORSE RACING TRACKS

Find all this in one place!

AMPLE TOURIST ACCOMMODATIONS

Wonderful sport fishing [illegible] year round
[illegible] exciting things to see and do in Southern California.
See Southern California people right where you live...

Come on out this year. [illegible]

Free Color Booklet · Mail Coupon Today

[illegible]

Name _____

[illegible]

Address _____

[illegible]

City _____ State _____

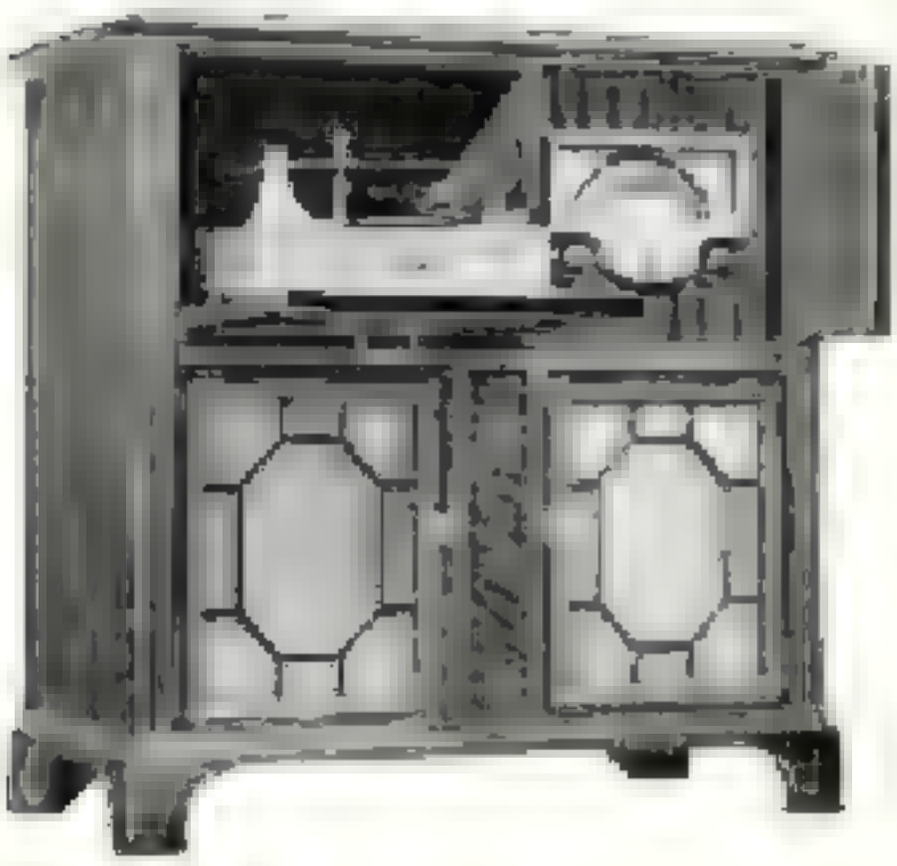
[illegible]

Advertisement [illegible] employment

ALL YEAR [illegible] OF SOUTHERN CALIFORNIA, LTD. [illegible]

Zenith—The Royalty of Radio

Now brings you a new world of Record-Radio Enjoyment!



New Zenith "Coppendale" Radio-Phonograph

[illegible]

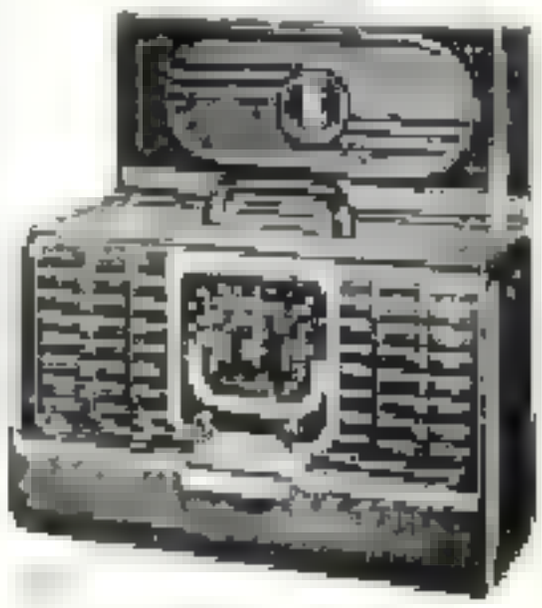
$279.95

1 New and Greater 3-Way "Cobra" Automatic Record Changer

[illegible]

2 New, Improved Super-Sensitive FM Reception

[illegible]



New Zenith "Trans Oceanic" Portable Radio

[illegible]

$99.95

ZENITH RADIO and TELEVISION

[illegible]

Colorado

Nature's Vacationland

GOLFING
Year-Round

PICTURE TAKING

The Colorado Rockies seem created to revive to humans the true joy of life.

You feel the zest of youth in the pure air that sweeps down from snowy heights.

Vast grandeurs inspire you under blue skies by daytime and star-sprinkled heavens at night.

You find peace and freedom in the protection of the guardian mountains.

Year-round, each season in turn, here is Nature's own vacationland for your enjoyment.

Spring soon will offer inviting highways, freedom from crowds, new flowers in lower valleys and Highland meadows. Then summer in the richness of its glories.

Come. Ride, drive, enjoy your favorite sports, rest, relax.

Surely visit Denver — city of beauty, pleasant climate, health and opportunities for you to share.

Write for any specific information about Denver and Colorado. This community organization will gladly help you plan your vacation and are here at your service. Check and mail the coupon for material that will assist you in your planning.

Denver

CONVENTION AND VISITORS BUREAU
519 17th Street, Denver, Colorado **Dept. 501**

Denver and Its Mountain Playgrounds ☐
Colorado Scenic Highway Map ☐
Directory of Hotels and Motels ☐
Mountain Resorts and Dude Ranches ☐

NAME _____

STREET AND NO. _____

CITY _____ STATE _____

YEAR-ROUND VACATION CENTER

I'M VERY DEAF BUT I HEAR

Everything with My New

ZENITH® "MINIATURE" HEARING AID

Dear Sir: deafness kill the joys of living? [illegible] Zenith hearing aid [illegible] Miniature Radionic [illegible] 30-Day Return Privilege [illegible] ready to wear [illegible] Hearing Aid Dealer [illegible] coast dealer [illegible] free descriptive literature on request. Address—

Zenith Radio Corporation, Hearing Aid Division
Dept. 264, 5801 W. Dickens Ave., Chicago 39, Ill.

Makers of World Famous Zenith Radios, FM and Television Sets.

FLOWERS SAMPLE

MAKE YOUR OWN METAL GARDEN MARKERS

[illegible] is the first practical [illegible]

ROOVERS JOSEPH M. LOTSCH, PRESIDENT
247 Nassau St., New York 7, N. Y.

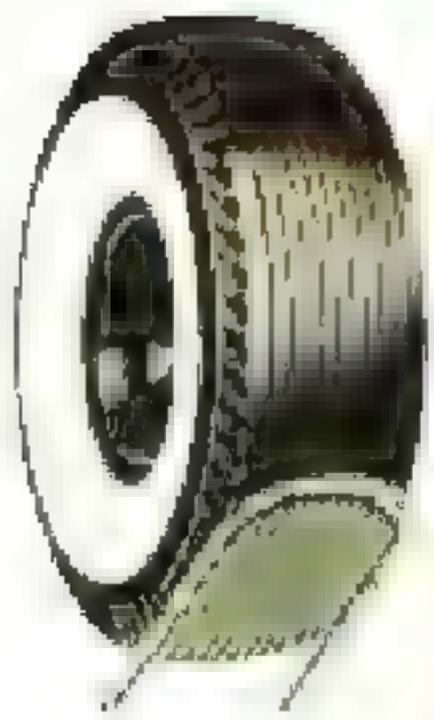
★ FOR THOSE WHO CANNOT OR SHOULD NOT CLIMB STAIRS

[illegible]

Sedgwick MACHINE WORKS
257 West 17th St., New York

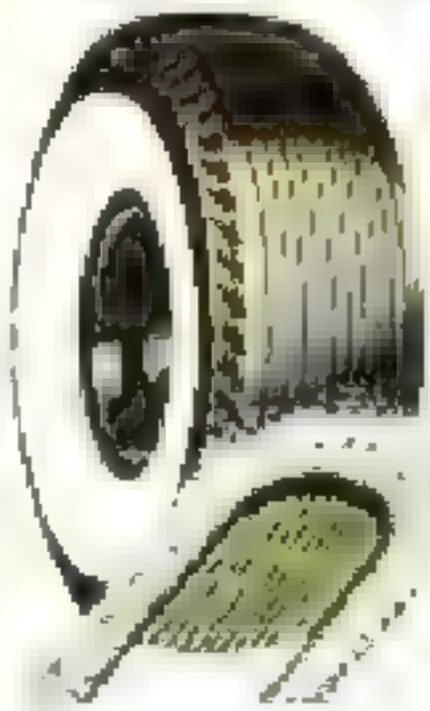
ELEVATORS AND STAIRWAY CHAIRS

What can you buy with the difference in price that compares with their safety?



RUNS LIKE THIS: What could be quieter, smoother running than continuous strips of tread-rolling rubber?

STOPS LIKE THIS: Apply the brakes and, instantly, the ribs wrinkle; Action-Traction goes to work for a quicker stop, rain or shine.



THINK how little it matters in money—and how much in other ways—to buy tires on the basis of Human Mileage. To be free of worry. To know that your family . . . and those who ride with you . . . are protected by General Tire's extra measure of safety, running and stopping.

THE SUPER-SQUEEGEE gives new low-pressure comfort with high mileage, blowout protection. And Action-Traction makes it quicker stopping, even on wet pavements. What can you buy with the difference in price that matters so much under all conditions of driving today?

THE GENERAL TIRE

This is Florida—Sunshine U.S.A.—where everything you do and every place you go are filled with glorious adventure.

This year take it all in—the brilliance of Florida's palm-fringed beaches and sun-swept surf, the tingling excitement of landing that first, or twenty-second or big game fish, the thrill of driving one down the middle of velvet-green fairways. This year discover for yourself the splendors of Florida's scenic landmarks, the glamour of its renowned spectator events, the sunshine of its nights under the stars. And this year see with your own eyes why so many millions agree, there's no place like Florida for sunny pleasure, healthful relaxation and sheer good living.

Florida

MAIL THIS COUPON TODAY

STATE OF FLORIDA,
3102 COMMISSION BUILDING TALLAHASSEE

Please send at once free 48 page booklet in full color "Florida, the Sunshine State"

Name _____

Street and No. _____

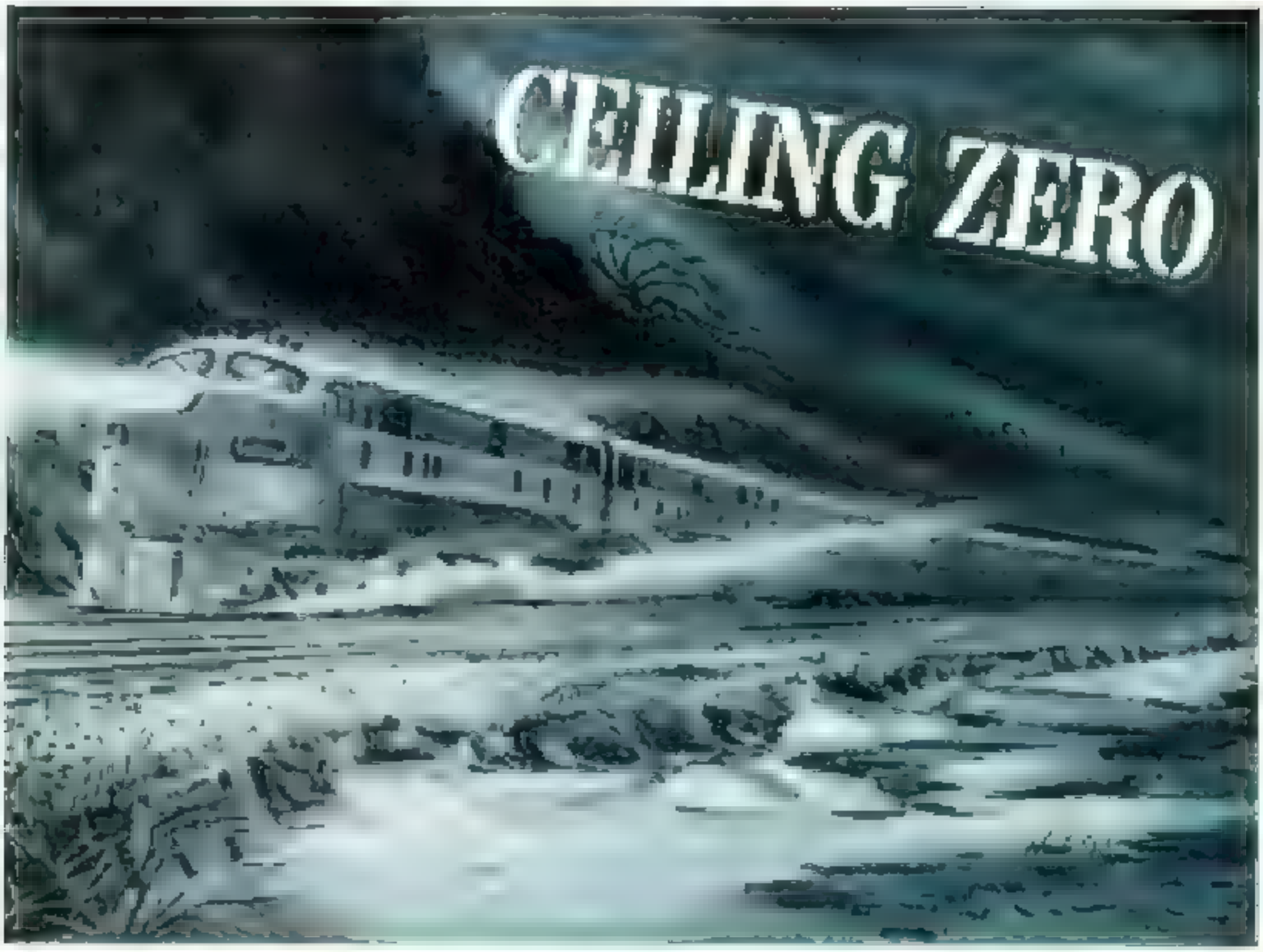
City _____ Zone _____ State _____


You'll Live Here

Bermuda


MOTO-MOWER
LAWN
$79.95
The MOTO-MOWER Company


PLAN NOW TO Live IN
COLORADO SPRINGS
AT THE FOOT OF PIKES PEAK
Colorado Springs
and MANITOU SPRINGS
at the foot of PIKES PEAK
COLORADO SPRINGS CHAMBER OF COMMERCE
AMERICA'S FINEST YEAR ROUND CLIMATE



But you're *sure* of your travel plans on New York Central!

You're at ease in mind and body aboard world's greatest fleet of new Passenger Streamliners and Dreamliners. New coaches with lean-back seats, picture windows and modern dressing rooms. New, private room sleeping cars or economical berths if you prefer. Famous New York Central meals, in smart new diners. And for relaxation you'll find refreshments and good company in New York Central's new lounge cars. Best of all, neither stormy skies nor icy roads interfere with your plans. You go, weather or no, when you go New York Central!

NEW YORK CENTRAL

The Water Level Route · You Can Sleep

ABOUT YOUR HEART

What your heart does . . .

The heart is the hardest working organ in the body. It beats about 100,000 times a day, and in the course of 24 hours pumps more than 2500 gallons of blood through the blood vessels.

The heart's ability to function normally may be affected if it is subjected to prolonged or excessive strain, or if it is attacked by disease. Fortunately, doctors now can do more than ever before to help the heart of trouble appears.

Heart disease is the leading cause of death in our country, and the proportion of deaths from this cause has been increasing. Authorities point out, however, that this increase may be a reflection of the fact that, due to medical progress, more and more people are reaching the later years of life when heart ailments are most likely to occur.

What medical science is doing . . .

Today, medical research has many new tests for the heart.

One such development is called *angiocardiography*, in which an opaque solution is injected into the blood stream. By means of X-ray, the doctor then can study the chambers of the heart, the major blood vessels in the chest, and the lungs.

Another technique, in which a small tube is inserted through an arm vein into the chambers of the heart, provides information about the amount of blood the heart is pumping.

There are also new exercise tests which furnish knowledge about how the heart functions under strain. These and other advances give the doctor more accurate methods of diagnosing heart trouble than have been possible heretofore.

What YOU can do . . .

Specialists say that there is a great deal the individual can do to help keep his heart sound and strong.

Following the doctor's suggestions and a daily routine of healthful living may help to avoid heart ailments, or to limit their effect.

It is also important to have regular physical examinations by a doctor. Such check-ups generally insure that if heart trouble should occur it will be discovered early, when modern methods of treatment will help most to control it.

Under good medical care, most people with heart ailments can learn to adjust their lives to the work capacity of their hearts. By so doing, they are often able to enjoy long and happy lives of nearly normal activity.

Research on diseases of the heart is interesting. To aid in this work, 148 Life Insurance Companies support the Life Insurance Medical Research Fund which [illegible]

Dirt tossed into a river told no tales

One of the constant dangers faced by early explorers of the West was having supplies they'd left along the trail stolen by the Indians.

And so experience soon taught the men to build a cache. The spot picked for the hiding hole was usually near a stream. Before [illegible] digging, [illegible] cover of the area with skins to prevent [illegible] scuffing of the grass.

Carefully they removed a patch of sod and set it aside. Dirt from the hole was meticulously placed on the skins, a separate pile on each.

After stowing away the supplies—with a layer of [illegible] grass on the bottom and a deerskin [illegible] the sod was [illegible] dirt was [illegible] stream, leaving not a [illegible] sign of any digging to [illegible] hiding place away.

Having supplies handy on the return trip was [illegible] life and death to explorers. And [illegible] have to keep the party safe.

[illegible] have thought of it this way [illegible]

up party of you're head of a family. You need to know how to keep mishaps from ruining your hangs into hardship and want. Except you don't have to [illegible] from sad experience. [illegible] achieve family security.

There's an expert near you who can show you how. It's done with the aid of a pen. Your travelers agent can help you by helping you decide the kinds and amounts of insurance you need. He [illegible] off your mind. He'll keep your [illegible], make changes as you need them.

Why not talk with Your Travelers man today?

MORALS INSURE IN

The Travelers

ALL FORMS OF INSURANCE AND SURETY BONDS

The Travelers Insurance Company, The Travelers Indemnity Company, The Travelers Fire Insurance Company, The Charter Oak Fire Insurance Company, Hartford 15, Connecticut. Serving the insurance public in the United States since 1864 and in Canada since 1865

YOUR HOST OF THE AIRWAVES

The Coca-Cola Company presents

EDGAR BERGEN with CHARLIE McCARTHY

CBS 8 p. m. EST every Sunday

And every day...wherever you travel, the friendly red cooler is your

HOST OF THE HIGHWAYS... HOST TO THE WORKER in office and shop... HOST TO THIRSTY MAIN STREET the country over.

These Cine-Kodak Cameras are doing a lot of traveling these days!

Cine-Kodak Reliant Camera f/1.9 It's Kodak's newest "Eight"! Fast Ektanon Lens. Finger-tip, sprocketless loading. Slow motion. And very low on the expense. $97.50.

Cine-Kodak Reliant Camera f/2.7 That same fine and compact little camera with a fixed focus lens. Likewise features built-in exposure computer. Now only $79

Cine-Kodak Magazine 8 Camera Here's film movie making at its simplest—the camera "magazine loads"! Fine, fast f/1.9 lens; speed choice includes slow motion. $147.50.

Cine-Kodak Magazine 16 Camera The 16mm. counterpart of the "Magazine 8," this camera makes larger images that lead to larger movies. With superb f/1.9 "Ektar" Lens, $175.

Cine-Kodak Special II Camera The "Special II" is the world's most versatile 16mm. motion-picture camera, making Hollywood effects with amateur ease. From $898.50

Prices include Federal Tax

Kodak

Eastman Kodak Company
Rochester 4, N. Y.

NEW **VIEW-MASTER**

full color pictures that "Come to Life"

in THREE DIMENSIONS

✦ **THE EASTER STORY.** [illegible]

✦ **EGYPT.** [illegible]

✦ **ALASKA.** [illegible]

✦ **PERFORMING ELEPHANTS.** [illegible]

✦ **ADVENTURES OF TARZAN.** [illegible]

View-Master [illegible] pictures are [illegible] Scenic Parks [illegible] View-Master Stereoscopes and Projectors. Over [illegible] are available [illegible] Photo, Gift and Department Store.

REELS 35c each 3 for $1.00
STEREOSCOPES $1.00
Jr. PROJECTORS $9.95

where and when you need it!

Portable heat-makers that really make cold rooms comfortable. Just plug into a wall outlet. Completely automatic, with trouble-free thermostatic control. Made of cast iron, just like a stationary radiator. Will last a lifetime. Comes already set just where you need it! And only when you need it! Clean, odorless. Three sizes AC or DC, $57 to $76 FOB factory. Lower pay for itself in comfort, safety and convenience. Learn the whole story of this efficient heater—use the coupon below.

Ideal for:

Bedrooms • Nurseries • Bathrooms • Garages and Offices • Nurseries • Sun Rooms • Work Shops • Sun Porches

BURNHAM *Portable* **ELECTRIC STEAM RADIATOR**

Burnham Corporation, Electric Radiator Div.
Irvington, N. J. Dept. NG-25

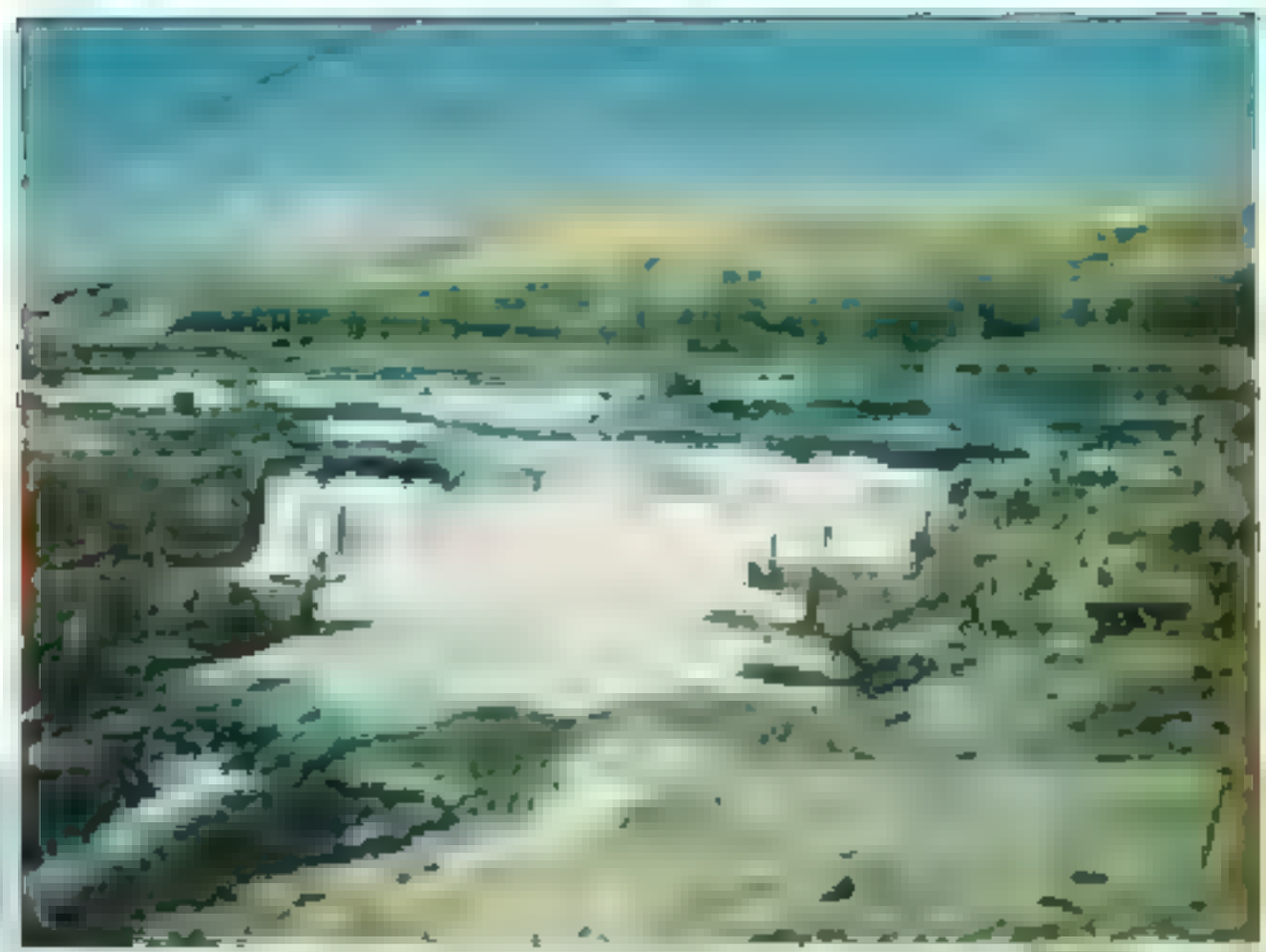
Please send free folder [illegible] to Burnham Portable Electric Steam Radiator.

Name

Address

City State

You'll Remember Oregon!



Indians fishing for salmon at Celilo Falls beside the Columbia River Highway.

Yo'll

TRAVEL INFORMATION DEPT., ROOM
STATE HIGHWAY COMMISSION, SALEM, OREGON

Name

Street

City

Zone _____ State _____

PLEASE FILL IN BLANKS BELOW, DETACH, AND MAIL TO THE SECRETARY

Recommendation for Membership

IN THE

NATIONAL GEOGRAPHIC SOCIETY

** The Membership Dues, Which Are for the Calendar Year, Include Subscription to the National Geographic Magazine*

To the Secretary, National Geographic Society,
Sixteenth and M Streets Northwest, Washington 6, D. C.: _____ *1950*

I nominate _____
(PRINT NAME OF NOMINEE)

Occupation _____
(This information is important for the records)

Address _____
(PRINT ADDRESS OF NOMINEE)

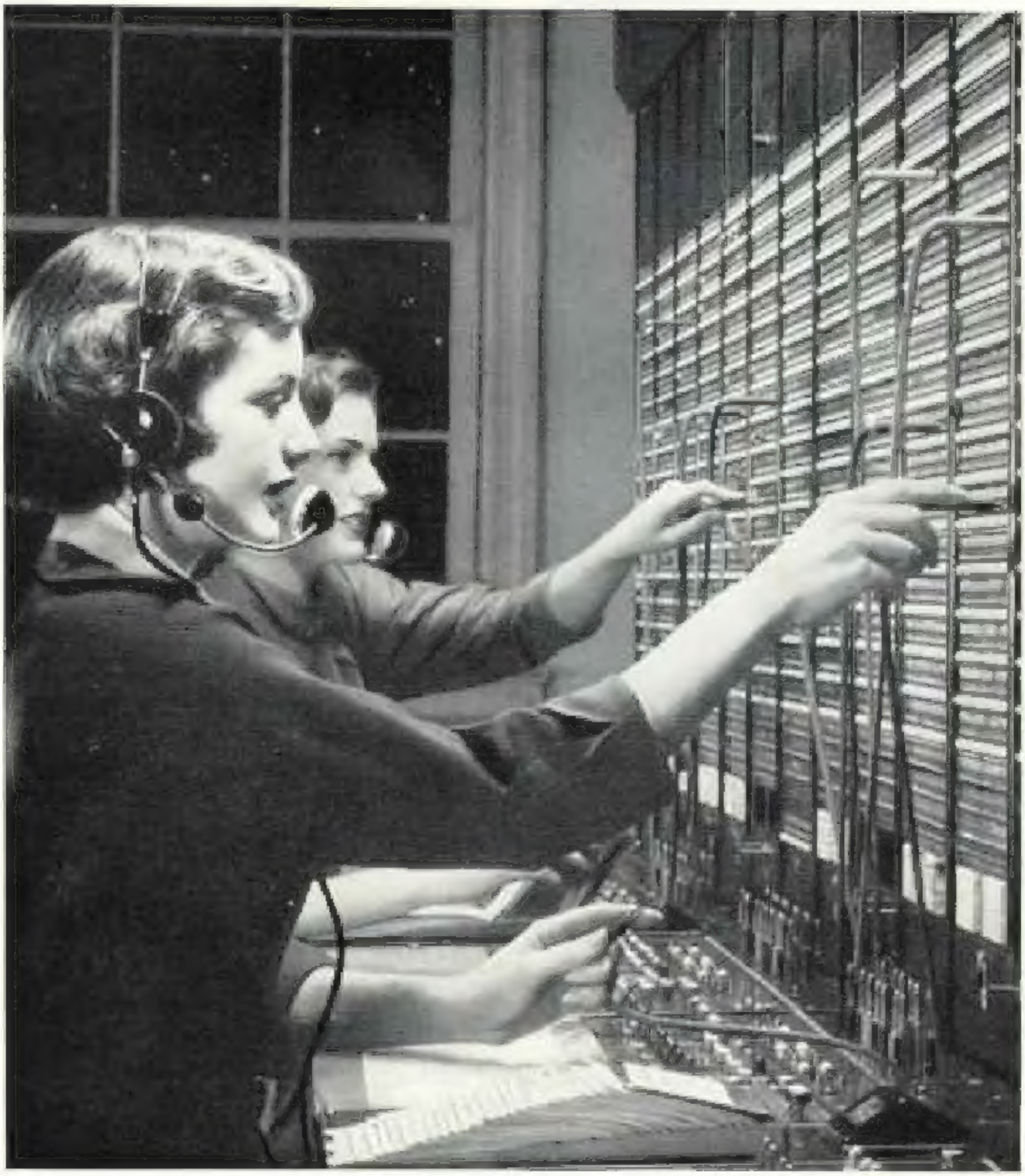
_____ *for membership in The Society.*

Name of nominating member _____
(PLEASE PRINT)

Address _____

* DUES: Annual membership in United States, $4.00; Canada, $5.00; abroad, $5.00. Life Membership, $100.00 U. S. funds. Remittances should be payable to National Geographic Society. Remittances from outside of continental United States and Canada should be made by New York draft or international money order.

2-50



SERVICE THAT NEVER SLEEPS . . . Whatever the need or the hour, the telephone is on the job—ready to take you where you want to go, quickly and dependably. Telephone service is one of the few services available twenty-four hours a day—weekdays, Sundays and holidays. Yet the cost is small—within reach of all . . . **Bell Telephone System.**

1. When you give a watch to someone you love, it's a constant reminder of you and of the importance of time. And when you give a watch with a quality Swiss *jeweled-lever* movement, you can be sure that your gift not only leads in beauty but in dependability and downright value. So—*don't be fooled by so-called watch "bargains"—you usually get just about what you pay for!*

Fine way to say "Happy Birthday"

2. See water- and shock-resistant, self-winding and calendar watches, chronometers and chronographs. Features like these are what make *fine Swiss watches such treasures of lasting pride.*

3. Your watch ticks 432,000 times a day. These impulses are transmitted far more accurately through the jeweled pallet in a jeweled-lever watch than through the metal pin in a cheap watch.

4. The smartest new watch fashions are made possible by fine Swiss movements. Always—*it's the movement that counts—be sure your new watch has a quality Swiss jeweled-lever movement.*

5. Your watch can be serviced economically, promptly, *if it* has a Swiss jeweled-lever movement. And, when you buy, *rely on a trusted jeweler for the best Swiss watches in your price range.*

For the gifts you'll give with pride—let your jeweler be your guide

The WATCHMAKERS OF SWITZERLAND